REVIEW OF DIAGNOSTIC LABORATORY SERVICES

A REPORT TO
THE MINISTER OF HEALTH
PROVINCE OF SASKATCHEWAN
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CONTENTS

PAGE

1. Executive Summary 1

2. Introduction 9

    2.1 Terms of Reference 9
    2.2 Laboratory Licensing Categories 15
    2.3 Laboratory Services in Other Provinces 17
    2.4 Motivation for the Review 26

3. The Growth in Costs and Utilization of Laboratory Services 27

4. Current Funding Mechanisms and Organizational Structure 36

5. Estimated Magnitude of Available Savings 41

6. The Control of Laboratory Utilization 51

7. Recommendations 55

8. Implementation 91

9. Conclusion 94

Bibliography

Appendix A - Individuals Interviewed by the Laboratory Review Committee

Appendix B - Organizations Interviewed by the Laboratory Review Committee

Appendix C - Laboratories Toured by the Laboratory Review Committee

Appendix D - Briefs, Reports and Letters Presented to the Laboratory Review Committee

Appendix E - Laboratory Review Utilization by Prince Albert and Swift Current Residents

Appendix F - Needs Assessment

Appendix G - Factors Assumed to Contribute to Laboratory Utilization Problems

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1. EXECUTIVE SUMMARY

Diagnostic laboratory services represent the sector of the health care delivery system with the fastest growth. During the five years between 1987/88 and 1991/92 the private sector laboratory costs grew by 48.6%, hospital laboratory costs as budgeted grew by 31%, and the Provincial Laboratory costs grew by 33%. For the year 1991/92 total diagnostic laboratory costs were $71.1M, which represents 4.4% of the total health expenditure of $1.6 billion by the province.

The laboratory system in the province has never been planned as a single system. It is fragmented in terms of service delivery and management. It has only recently come under scrutiny by government and organized medicine following the proclamation of the Medical Laboratory Licensing Act. It is clear that the information services available to government and the laboratories are inadequate. The utility of available information is confounded by a lack of consistency in reporting and a lack of consistency in collection of information. Private laboratories report by volume of tests to MCIB, while public sector laboratories report workload to hospitals and government in the form of workload units, with no consistency in how the units are applied. Physicians and hospitals have little information on the testing history of patients, with consequent duplication of tests.

The funding of laboratories is not uniform, with the private laboratories funded on a fee-for-service basis, hospital laboratories funded out of the hospital global funding mechanism and the Provincial Laboratory on a block grant from the provincial government. The incentives for service delivery therefore differ between the different laboratory sectors. These different incentives are responsible in part for the greater rise in costs of the private sector.

Much has been written and said about the relative costs of laboratory testing at the level of individual tests in the private and public sectors. This issue cannot be resolved and it becomes irrelevant in a reformed laboratory system where funding methodologies are uniform and subject to strict budgetary control.

There are many examples of over-capacity and duplication of services within both the private and public sectors of the diagnostic laboratory service which are responsible in part for the high cost of the service. Duplication and over-capacity are a result of fragmented management and lack of a co-ordinated delivery of service within the system. Management and service delivery changes within laboratories would lead to corrections within the system leading to potential savings of $13M per annum, or 18% of total laboratory costs.

The unplanned nature of the laboratory system has led to service duplication in some areas which have a potential for encouraging a deterioration in the quality of service. An example is the screening cytology service, which requires highly trained cyto-technologists maintaining their expertise by exposure to large numbers of tests. It also requires a patient registry be established. Fragmentation in this service has already occurred.

The utilization of diagnostic laboratories by physicians is influenced by several factors such as medical uncertainty, convenience, financial motives, demands from patients, and fear of malpractice claims. It is estimated that only 70% of testing contributes to patient care, with the remaining 30% being of no value, and therefore in purely clinical terms unnecessary. It is essential from the cost and quality viewpoint to encourage improved utilization of laboratories. This can be achieved by removing financial incentives which encourage increases in the volume of testing and by educating physicians on the most appropriate use of diagnostic laboratories.

The wide uncertainty in appropriate volumes of testing coupled with the unplanned nature of the current laboratory system leads to increased cost. It is not possible to say with certainty how much the laboratory system in the province should cost, but it is clear that a well managed, appropriately used system would cost in the region of $50M to $55M once some impact had been made on physician utilization patterns. A total financial cap on laboratory services within the province would be appropriate, with the total amount being within the range of $55M. The imposition of a financial cap for each health district would have an immediate beneficial effect on utilization and financial accountability on the part of laboratory managers. We believe the diagnostic laboratory service can become more cost effective and continue to provide a high quality of service by adopting some far reaching changes.

a) Establish an annual budget for laboratory services in the province, with distribution of funds to district health boards based on demographics.

b) Where district health boards exist, have them carry the responsibility for the rationalization and management of laboratory services within their districts.

c) The Department of Health establish a laboratory management system to serve areas of the province where district health boards have not been established, and carry responsibility for the Provincial Laboratory.

d) Discontinue the fee-for-service system of remuneration for laboratory services.

e) Governing bodies and the Department of Health contract with laboratories either within or outside districts for laboratory services.

f) Establish a Provincial Advisory Committee on Laboratory Medicine to advise government, providers and governing bodies on standards of laboratory service delivery.

g) Introduce a province-wide laboratory management information system with test results available on-line to all physicians and hospitals.

h) Commence an intensive educational campaign aimed at encouraging physicians to reduce laboratory utilization in keeping with the provision of high quality cost-effective health care.

The following are the recommendations emanating from this review:

1) Each District Health Board to be provided with a budget by the Department of Health for the provision of laboratory services within its area of jurisdiction.

2) Each District Health Board to either establish a Diagnostic Laboratory Service Department or delegate the responsibility for the management of the Diagnostic Laboratory Service in the district to one of its major hospitals.

3) District Health Boards to contract with laboratories to provide diagnostic services to hospitals and to the community.

4) Laboratory service contracts to be awarded on the basis of best price and compliance with quality standards to be established prior to tendering.

5) Where District Health Boards are not yet established, the Department of Health to contract for the provision of laboratory services within designated geographical areas using, as a base, the budget for laboratory services allotted to those populations.

6) The costing of tests and the reporting of workloads by laboratories in the province to be standardized in order that effective comparisons can be made between laboratories both within the province and beyond.

7) A province-wide diagnostic laboratory information service to be developed with on-line access provided to physicians' offices and hospital outpatient and emergency departments.

8) A Provincial Advisory Committee on Diagnostic Laboratory Services to be established with the mandate to develop standards of service and management for diagnostic laboratories.

9) The fee-for-service basis of laboratory remuneration to be discontinued.

10) Laboratory services in doctors' offices to be de-insured and where basic testing (e.g. dipstick testing and pregnancy testing) in physicians' offices are considered by the Provincial Advisory Committee on Diagnostic Laboratory Services to be appropriate, the reagents and kits be provided by the District Health Board to physicians at no cost.

11) The Saskatchewan Medical Association to confine its negotiations on behalf of pathologists to the negotiation of salaries and contracts with employers.

12) A provincial review of the remuneration and conditions of service of pathologists to be undertaken with the elimination of conflict of interest and double payment among its objectives.

13) The Provincial Laboratory to confine its role to that of a Public Health Laboratory and discontinue routine diagnostic testing.

14) Screening cytology services for the province to be centralized in two laboratories, one in Saskatoon and one in Regina. The cost of this service would be allowed for in the budgetary allocation of the two District Health Boards.

15) The supervision of laboratories in rural areas by pathologists to be standardized and funded adequately, and pathologists to be accompanied on their visits by a Registered Laboratory Technologist.

16) The College of Medicine, the College of Physicians and Surgeons, the Health Services Utilization Research Commission and the Saskatchewan Medical Association embark upon a co-ordinated educational program for physicians designed to influence the ordering of laboratory tests in a manner consistent with the delivery of an optimum quality of care with the optimum use of laboratory resources.

17) The College of Medicine, the College of Physicians and Surgeons, the Health Services Utilization Research Commission and the Saskatchewan Medical Association work together to develop guidelines and protocols designed to guide physicians in ordering laboratory tests under common clinical circumstances.

18) Pathologists, as part of their duties, to assist physicians in the appropriate ordering of tests and to monitor physician ordering practices in their laboratories.

19) Each District Health Board to establish a Laboratory Utilization Committee with a mandate to monitor and influence physician ordering patterns.

20) A standard laboratory requisition form, with only a few commonly ordered tests appearing on the form, to be developed and implemented.

21) All tests to be ordered separately without the opportunity to order batteries of tests.

22) The average cost of each laboratory test to be printed against each test on the requisition form.

2. INTRODUCTION

2.1 TERMS OF REFERENCE

In July, 1992, Saskatchewan Health initiated and funded a Laboratory Service Review to evaluate how diagnostic laboratory services are delivered in Saskatchewan with a view to making recommendations which would produce a more efficient service.

Purpose

The Review Committee was asked to review current laboratory services and recommend the most efficient, cost-effective method of delivering and funding quality laboratory services in Saskatchewan.

Background

Laboratory services are delivered by a variety of laboratories in Saskatchewan. Diagnostic support is provided by private (physicians' offices and pathologist supervised laboratories) and public laboratories (hospitals and the Provincial Laboratory). Public health support is provided exclusively by the Provincial Laboratory.

The cost of laboratory services (most particularly in the private sector - pathologist supervised laboratories) is the fastest growing component of the health care sector. A variety of funding mechanisms are used and include: block funding (Provincial Laboratory), global funding (hospital laboratories) and fee-for-service (physicians' offices and pathologist supervised laboratories).

There is evidence that excess capacity exists within the public sector due to a transfer of testing to the private sector, and that expenditures are not optimized. Reasons for the lack of optimization include: duplication of testing and infrastructure, unnecessary testing, lack of incentives to reduce utilization, demand not necessarily linked to diagnostic need, fragmentation of the existing system, the absence of appropriate test protocols, etc.

This issue is neither new nor unique to Saskatchewan. Most other Canadian jurisdictions have either recently conducted, or are now conducting, reviews of their respective delivery mechanisms.

Following recommendations of the Lone-Warren Report, 1985, Saskatchewan Health began to implement a Quality Assurance program for laboratory medicine in the province. Laboratory licensing by the Department of Health and an accreditation program developed by the College of Physicians and Surgeons is expected to have an impact on the efficiency of the system.

Scope of Work

The Review Committee was directed by the Minister of Health to:

1. Analyze the current structure for delivering laboratory services in Saskatchewan. This should include the review and analysis of:
    - utilization by each of the delivery models: Provincial and hospital laboratories, laboratories in physicians' offices and free-standing, privately-owned laboratories;
    - extent of duplication of laboratory testing;

- current capacity of Saskatchewan laboratories (i.e. duplication of infrastructure between physicians' offices and between physicians and hospitals);
- costs of laboratory testing;
- funding mechanisms for laboratory services.

2. Review and analyze the present system and activities underway for altering the delivery of laboratory services in other jurisdictions.

3. Identify those laboratory services which should be provided in order to meet the needs of Saskatchewan residents for appropriate diagnostic and public health services, including:
   - necessary hospital laboratory services, recognizing the variation in size and functions of hospitals in Saskatchewan and the turnaround time requirements of some tests;
   - necessary outpatient and ambulatory services, recognizing issues of timeliness;
   - tests requiring specialized skills or equipment which should be centralized in one in-province location and those which should be referred out-of-province; and
   - specific public health services traditionally provided by public sector laboratories.

4. Make recommendations to address inefficiencies and ineffectiveness which exist in the delivery system. Options which may be considered include:
   - alternate funding/payment mechanisms;

- restructuring of the current system with reassignment of laboratory responsibilities (capturing, to the greatest extent possible, economies of scale);
- changes/enhancements of the existing specimen transportation systems;
- province-wide laboratory information network.

5. Develop an implementation plan that clearly identifies how laboratory services should be delivered and funded, the related capital and operating costs (and savings from the existing system or future cost avoidance), and the short-term and long-term implications of recommended changes (infrastructure, quality of patient care, staffing, employment, etc.).

Factors to be Considered

- hospital laboratories, private laboratories and the Provincial Laboratory will all be included in the review;
- recommendations will be made in recognition of directions being taken federally and in other provinces;
- the public health functions, currently performed by the Provincial Laboratory, must continue to be available;
- laboratory services specific to the delivery of quality acute care treatment services must continue to be available in hospitals;
- any references to economic diversification should relate specifically to clinical laboratory services.

Process

The Review Committee is free to contact, consult with and otherwise obtain information from all parties currently involved in the delivery of laboratory services in the province, including:

- Provincial Laboratory;
- Saskatchewan Medical Association;
- Saskatchewan Association of Pathologists;
- Representatives of the privately operated organizations delivering laboratory services in the province;
- Saskatchewan Health-Care Association;
- Saskatchewan Society of Medical Laboratory Technologists;
- Health Boards - Regina and Saskatoon;
- Other Health Boards;
- College of Physicians and Surgeons of Saskatchewan;
- Pathologists and other laboratory medicine professionals;
- Officials of Saskatchewan Health;
- Etc.

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Timeframe

The Reviewers were asked to submit an interim report at the end of September, 1992, and a final report, with recommendations, was to be submitted to the Minister of Health by October 31, 1992.

The Review Process

The Review Committee received extensive information in the form of reports, studies and up-to-date statistics on laboratory services in Saskatchewan, and other parts of Canada, from the Department of Health.

The Committee received authority to contact all individuals and groups delivering laboratory services in Saskatchewan. Contact was made with both public and private sector laboratories in urban and rural centres, as well as the Provincial Laboratory. Tours of laboratories were followed by briefs and presentations from laboratory directors and personnel, who were then questioned vigorously by the Committee.

The Committee interviewed officials from Saskatchewan Health, representatives from health care associations, community clinics, district boards, the College of Physicians and Surgeons, the Saskatchewan Medical Association (SMA) as well as representatives of implicated unions.

Lists of the Review Committee's tours and hearings, and reports or briefs submitted by interested parties are appended.

2.2 LABORATORY LICENSING CATEGORIES

There are 203 Category 1 physician office laboratories performing an average of 4 tests. This category is restricted to a total of nine tests which include: haemoglobin, haematocrit, glucose, pregnancy testing, urinalysis dipstick, urinalysis microscopic, yeast slide examination, trichomonas slide examination and occult blood.

Category 2 laboratories are larger physician office laboratories that must employ a Certified Combined Technician as the minimum qualifications of laboratory staff. There are 24 laboratories in this category. These laboratories are restricted to 20 tests and perform an average of 10 tests.

Category 3 laboratories are privately owned pathologist supervised laboratories. These laboratories are in the major urban centres of the province including Regina, Saskatoon, Prince Albert, Lloydminster and Moose Jaw. A total of 8 Category 3 laboratories exist with an average of 81 tests licensed.

Category 4 laboratories include the satellite laboratories of the Category 3 laboratories. There are 70 satellite laboratories performing an average of 9 tests. These laboratories are found in Estevan, Lumsden, Moose Jaw, Prince Albert, Regina, Saskatoon, and Yorkton. Two of these sites are strictly blood collection sites with the other sites performing a small range of haematology and chemistry tests.

Category 5 laboratories include the 111 rural hospitals. These laboratories analyze mainly chemistry and haematology specimens. Some perform bloodbanking and microbiology on a limited basis. Chemistry profiles and microbiology are referred to the Provincial Laboratory from these hospitals. This category of laboratory has been actively solicited to send specimens to the Category 3 laboratories in return for free consultation services provided by pathologists or quicker turnaround times. Six hospitals in this category refer specimens to private laboratories. This category on average analyzes 28 different tests.

Category 6 laboratories include 7 large community hospitals with an average of 94 licensed tests.

Category 7 laboratories include 7 regional hospitals with an average of 129 licensed tests. The regional hospital laboratories are referral sites for some of the rural and community hospitals. However, the majority of referrals are still to the Provincial Laboratory.

Category 8 laboratories include the 6 base hospitals. They perform on average 315 different types of tests. This category of laboratory each performs their separate chemistry, microbiology, haematology and bloodbanking with no centralization of these services. Some of these hospitals are involved in specialized testing in the areas of genetics, cytogenetics, cytology and cancer treatment.

Category 9 includes the Provincial Laboratory which provides a range of 349 tests mainly in the chemistry and microbiology disciplines. Haematology or bloodbanking is not performed at the Provincial Laboratory. This laboratory is the major referral site for the province's hospitals and physicians. Many physicians that referred specimens to the Provincial Laboratory in the past now refer work to the private sector.

Category 10 laboratories are the two major Red Cross Centres that provide crossmatching services for the province.

Category 11 laboratories include laboratories which do not fall into any other category. These laboratories include sites such as the physicians' weight loss centres and community clinics.

2.3 LABORATORY SERVICES IN OTHER PROVINCES

The management of laboratory services across Canada shows some variation. Each province is concerned with the increasing cost of diagnostic testing, and different approaches to cost constraint are being considered or are being implemented. The following is a brief overview of Laboratory Services in some of the provinces.

1. Newfoundland

Each acute care general hospital has its own laboratory, with the smaller hospitals having an arrangement with the larger regional hospitals for service. These laboratories are funded through the global budget of each hospital. The Public Health Laboratory is funded directly by the Ministry of Health with its management reporting to an Associate Deputy Minister. There is, however, a plan to place responsibility for this laboratory with the teaching hospital in St. John's. There are no private laboratories in the province.

2. Prince Edward Island

There are seven hospitals in the province, but one of them does not have a laboratory. Specimens collected at that hospital are transported to the Queen Elizabeth Hospital in Charlottetown. Laboratories are funded through the hospital global budgeting process.

The clinical microbiology aspects of the Public Health Service are provided by two of the hospital laboratories. Non-clinical public health laboratory work is conducted by a government laboratory operating outside the health care system. There is no Provincial Laboratory as such.

There are no private laboratories in the province, although there is no legislation to prevent their establishment. Equally, there is no legislation which would provide a mechanism of payment to private laboratories.

Approximately 900,000 tests costing $110,000 are referred out of province. Cost containment activities are directed at reducing physician utilization and laboratory budgets.

3. Nova Scotia

Laboratory tests are insured under "The Hospital Act" if they are for diagnostic purposes and are ordered by a physician. Tests are conducted by hospital laboratories and by the Provincial Laboratory in Halifax, which is administered under the same management structure as the Victoria General Hospital. Some tests are referred out of province by hospitals. Since 1986, hospitals laboratories have been funded using a credit system which differs from Statistics Canada Workload Units. If sufficient funds are not available the province may not pay the true credit dollar value.

There is a cap on laboratory volumes using the hospital catchment area statistics. Based on the size of catchment areas, the volume of patient load determines how many tests will be funded per capita. Where a laboratory refers tests out, the costs of the tests are taken from the referring laboratory's budget. In order to influence laboratory utilization each hospital has a Utilization Management Committee on which the pathologists serve. Physician utilization of laboratories is monitored. Where utilization is reduced, the hospital Board is allowed to benefit by retaining 50% of savings. Pathologists are paid a laboratory management fee.

There are no private laboratories; however, physicians are permitted to do laboratory testing in their offices, but are not compensated for this service.

The province has no laboratory licensing legislation.

4. New Brunswick

The public hospitals provide laboratory services. In addition to the hospitals there are Health Centres which collect specimens which are, in turn, transported to the hospitals for testing. The Extra-Mural Hospital also collects specimens in patient homes and transports them to hospital laboratories. The hospitals are funded by a global budget, part of which is designated for laboratory services. The hospitals, however, have discretion to transfer funds to and from their laboratories. Under the new administrative structure of Regional Corporations the hospitals will continue to be responsible for the management of their laboratories. Small hospitals purchase laboratory services from the larger hospitals.

There are no private laboratories in the province. Physicians must have privileges in a hospital to be allowed to order tests in the hospital, and this applies to outpatient tests ordered from their offices.

There is no provincial laboratory at the present time. Public Health support is provided by the regional laboratories. In 1993 a Public Health laboratory will be opening, but this will not provide any clinical testing.

It is not clear how much testing is referred out of province, but what is referred out is in the fields of virology, heavy metal testing and some other sophisticated tests. It is not considered to be a significant amount.

5. Quebec

The province's laboratory system is primarily organized around hospitals. Private laboratories are not reimbursed from public sources, rather they bill patients directly. In 1990 this represented about 4.5% ($20M) of the total laboratory cost of $460M.

Quebec is divided into sixteen hospital regions with most of the regions having several hospitals. Smaller regions may have only one hospital. Tests are referred between hospitals with inter-hospital billing occurring. Such billing is considered by many to be more of a nuisance than it is worth.

The Provincial Laboratory functions as a major reference laboratory and does no routine laboratory testing.

Quebec undertook a review of its laboratory system in 1991; however, the report and its recommendations have not yet been made public.

6. Ontario

Ontario has had a laboratory licensing and inspection program since 1972. There are a total of 696 licensed laboratory facilities including 224 hospital laboratories, 173 private laboratories with 229 specimen collection centres in which no testing occurs. Forty-one of the specimen collection centres are operated by hospitals. In addition there are 13 Public Health Laboratories, 12 regional laboratories and one central laboratory in Toronto.

The Licensing Act effectively controls the establishment of new laboratories, specimen collection centres, addition of tests, changing of laboratory ownership and converting of existing laboratories to specimen collection centres, by requiring prior approval before any of the aforementioned can take place.

Specimen collection centres operated by hospitals are funded by the Ministry of Health. Fee-for-service billing is not allowed.

The province is concerned with utilization and costs and has attempted to curtail these by reducing payment for 18 tests which have become less labour intensive. It is also examining the possibility of placing a cap on utilization and associated payments.

In 1991/92 the total laboratory costs for Ontario were about $1 billion of which about $490M was paid to private laboratories. Physician office billings represented only 1% of the total laboratory cost. Private sector laboratories constituted 62% of total laboratory facilities in the province.

Hospital laboratories primarily serve their inpatient populations. Hamilton, Sarnia and Ottawa area hospitals have specimen collection centres for ambulatory testing. These centres are funded by the Ministry of Health.

Ontario is currently setting up a laboratory review which will require approximately one year to complete.

7. Manitoba

Manitoba has recently passed, but not proclaimed, new laboratory legislation. The Act establishes a licensing requirement, audit and inspection mechanisms, and it requires prior approval before a private laboratory can expand its range of tests, before new laboratories can be opened or before expansion to new sites can occur.

The Laboratory and Imaging Services Branch of the Department of Health is responsible for a regionalized laboratory service for about 75 rural hospitals. The Branch has full executive authority over the laboratories under its jurisdiction. There are 13 head units in as many regions, with satellite hospitals. Less frequently performed and complex tests are referred to urban hospitals. All pathology and cytology is referred to Winnipeg and Brandon.

Private laboratories have a strong presence in Manitoba, with an annual revenue of approximately $30M. Private laboratories are limited to Brandon and Winnipeg (about 10 in total). Expansion of private laboratories into the rural areas is not permitted.

There are approximately 20 procedures for use by physicians in their offices. Very few physician office laboratories exist outside of Winnipeg and Brandon. Physicians are not allowed to order profiles.

8. Alberta

There are four sectors to the Alberta laboratory system, all funded separately:

a) private laboratories - fee-for-service;

b) hospital laboratories - hospital global budget;

c) Provincial Laboratories - one in Calgary and one in Edmonton doing microbiology, public health and reference laboratory work only;

d) Red Cross - bloodtyping; crossmatching and prenatal screening under contract.

The province has developed a common procedure list which was implemented in hospitals on April 1, 1992. It is also working on a per procedure methodology which is currently undergoing validation. The objective is to obtain reliable cost information in order to identify efficient producers. The province also wishes to move away from global funding for hospital laboratories.

A provincial Diagnostic Services Advisory Committee has been established to focus on laboratory and diagnostic imaging services. Its objective is to achieve a 5% reduction in laboratory costs prior to November, 1992.

Laboratory licensing is more of an accreditation process utilizing the College of Physicians and Surgeons.

There are 8 major private laboratories in Alberta with 700 outlets and total revenues of approximately $62M - half of the total provincial laboratory expenditure.

9. British Columbia

Laboratory medicine in B. C. public hospitals is organized under 16 zones. Pathology activity in each of these zones is centralized in a major hospital and provided regionally. Where hospitals manage their own laboratories they are able to bill the Medical Service Plan (MSP), the physician paying agency, on a fee-for-service basis using the MSP schedule of benefits.

Within the above structure, pathologist groups have established contracts with some local hospitals and are paid on the basis of individual salary, a set amount per pathologist FTE, the British Columbia Medical Association professional fee component or some amount per Statistics Canada work unit.

In addition to the hospital sector of laboratory services, the private sector has three major private laboratory organizations.

A major review of laboratory services was completed in late 1989 and the question of laboratory services was also addressed by the Royal

Commission on Health Care and Costs.

It is clear from the above summaries of the different methods of managing provincial laboratory services that there is no Canada-wide consistency. Each province has its own method of solving what is seen as a universal problem of high cost, with several concerned with the penetration into the market by private laboratories. In five provinces -- Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick and Quebec -- private laboratories are not a significant participant in laboratory service delivery. A review of each provincial approach to laboratory service delivery fails to provide a precedent which would chart a course to be followed by Saskatchewan.

2.4 MOTIVATION FOR THE REVIEW

This review was commissioned in the second half of July 1992. Initially the deadline set for delivery of the Committee's report was October 31, 1992. This was subsequently brought forward, with the concurrence of the Committee, to October 9, 1992. The time constraints were initially very tight for a review of this type, but the Committee recognized early on the feasibility of working well within the initial time requirements. The basis of this recognition was that in order to make recommendations for the rationalization of laboratory services in the province it was not necessary to spend a great deal of time examining such micro-management issues as the relative cost per test between the different public and private laboratories. While the results of such an examination may have been of interest to some individuals, it appeared to the Committee that an examination of the macro-management and costing of the whole laboratory system would bear a greater yield. Even if the relative costs per test were of major importance, to unravel the intricacies of laboratory workload measuring techniques in the different laboratories would have demanded many months of activity. Such activity would have been hampered by incomplete information systems throughout the system, and in the end any opinions would have, of necessity, relied greatly on conjecture. The impetus behind the commissioning of the review was the concept that private laboratories were solely responsible for rising costs in the field. The Committee recognized problems within the whole system, which if ameliorated, would carry the potential for significant cost reductions.

It became apparent to the Committee early on in the process of review that the laboratory system in the province was a child of tradition, history, empire-building, self interest, and ineffective management. It was clear that the system needed a total reform without any particular section deserving of special attention. The laboratory system needs to be seen as a small part of the health care system and managed as such. It needs to be managed within clearly defined constraints and with public accountability. The cost per test is a managerial detail.

3. THE GROWTH IN COSTS AND UTILIZATION OF LABORATORY SERVICES

The cost of the provision of diagnostic laboratory services in Saskatchewan amounted to $71.1M in the financial year 1991/92, or 4.4% of the total health care expenditure of $1.6 billion. Laboratories collectively billed the Medical Care Insurance Branch (MCIB) $20.1M in 1991/92. Growth in the cost to MCIB of testing in the private sector was 48.6% between 1987/88 and

1991/92, with a 17.3% growth in the two years 1989/90 and 1991/92. During the same five year period growth in the cost of the hospital sector, as budgeted by the hospitals, was 31%, while the costs of the Provincial Laboratory grew by 33%. This growth occurred without any increase in population. In the current climate of financial restraint and the current concern with the ever rising cost of health care delivery in Canada, and in Saskatchewan in particular, it would be appropriate to review the laboratory system with a view to detecting areas where improvements in cost-effectiveness can be made and where a slowing in the rate of growth can be initiated.

The following table presents the rates of growth in private laboratory services and billings from the fiscal year 1983/84 to 1991/92. It shows the number of services billed grew by 25.2% over the period, despite a decline in 1984/85 caused by bundling of tests into the biochemistry panel and a slight reduction in population of approximately 0.4%. Over the period, the share of private sector laboratory work received by pathologists increased from 41.2% to 71.5% with respect to services and from 51.4% to 86.7% with respect to billings.

GROWTH IN LABORATORY UTILIZATION

SERVICES AND PAYMENTS - PRIVATE SECTOR ONLY

ALL PHYSICIANS

Year	Services ('000)	% Change	Payments ($'000)	% Change	Fee % Change
1983/84	2437.3	-	9,331	-	-
1984/85	2419.9	-0.71	10,474	12.26	-2.75
1985/86	2676.5	10.60	12,080	15.33	2.26
1986/87	2756.8	3.00	13,083	8.31	3.29
1987/88	2753.2	-0.13	13,547	3.55	0.00
1988/89	2868.7	4.20	14,760	8.95	1.48
1989/90	3003.2	4.69	17,156	16.23	3.75
1990/91	3117.3	3.80	19,644	14.50	2.96
1991/92	3051.8	-2.10	20,646	5.10	2.76
TOTAL		25.21		121.27	14.64
AVERAGE		2.85		10.44	1.72

PATHOLOGISTS

Year	Services ('000)	% Change	Payments ($'000)	% Change	Fee % Change
1983/84	1011.3	-	4,800	-	-
1984/85	976.7	-3.42	5,698	18.72	-2.75
1985/86	1203.8	23.25	7,240	27.06	2.26
1986/87	1310.2	8.84	8,275	14.29	3.29
1987/88	1348.4	2.92	8,956	8.23	0.00
1988/89	1483.3	10.00	10,058	12.30	1.48
1989/90	1829.7	23.35	13,322	32.45	3.75
1990/91	2104.4	15.01	16,310	22.43	2.96
1991/92	2183.3	3.75	17,900	9.75	2.76
TOTAL		115.89		272.95	14.64
AVERAGE		10.10		17.88	1.72

Note: The fee percentage change column refers to the change in a price index based on the MCIB fee schedule.

Source: MCIB

The increase in private sector services and billings cannot be entirely explained as a trend toward the privatization of laboratory services. Over approximately the same period (1984-1991), total haematology tests performed in hospitals increased by 130.1%, total public sector (hospitals and Provincial Laboratory) biochemistry services increased 12.2% and total public sector microbiology tests increased by 142.2%.

TOTAL HEMATOLOGY

	1979	1984	1991
Hospitals	234,328	296,178	495,929
Physician Office	45,549	64,427	56,180
Pathologist-supervised	43,776	61,539	146,481
Provincial Laboratory	0	0	0

TOTAL BIOCHEMISTRY

	1979	1984	1991
Hospitals	468,395	494,555	568,633
Physician Office	46,973	68,002	51,280
Pathologist-supervised	30,048	79,255	295,260
Provincial Laboratory	156,071	183,714	192,376

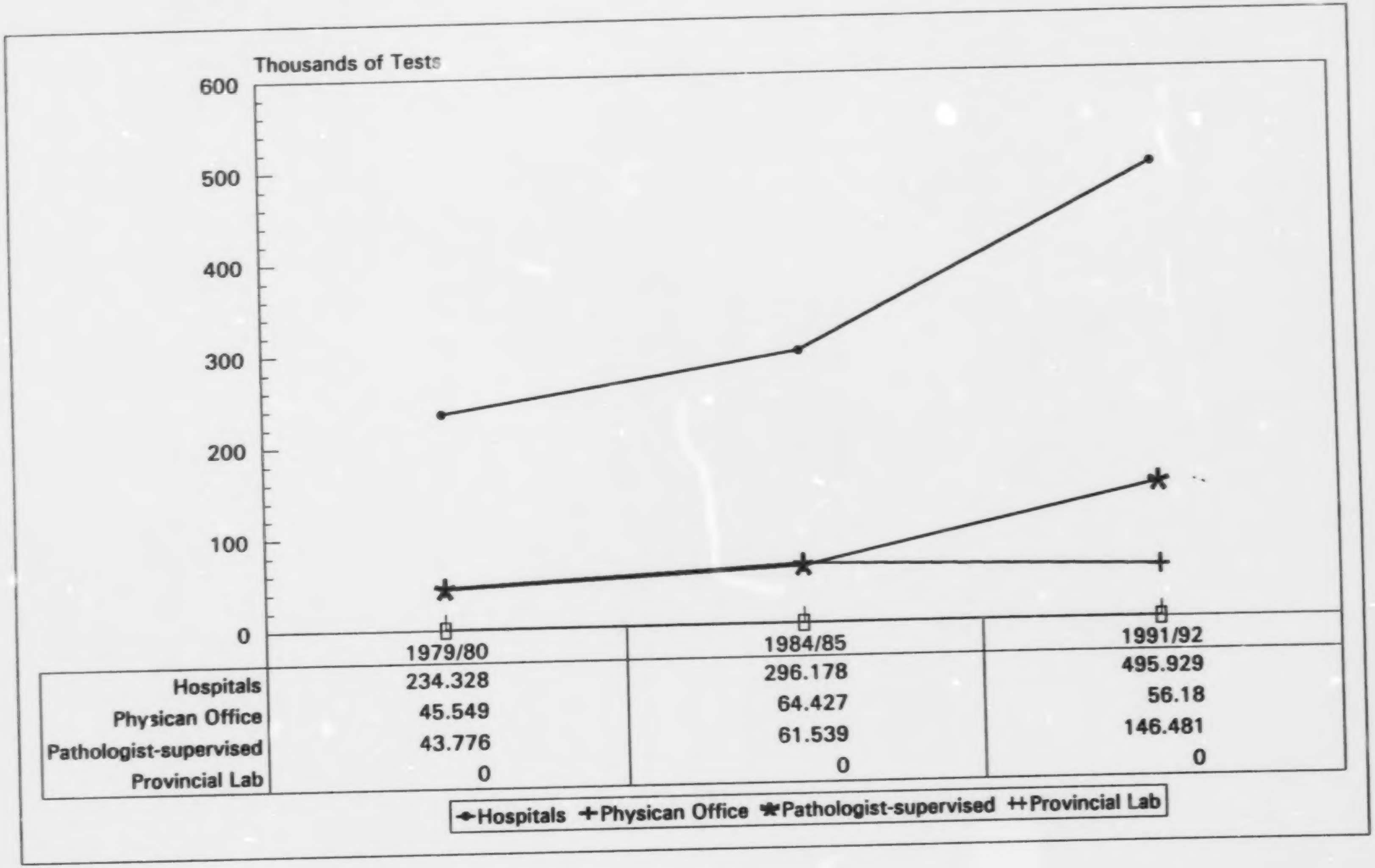
TOTAL MICROBIOLOGY

	1979	1984	1991
Hospitals	28,608	38,240	130,220
Physician Office	1,334	2,913	1,381
Pathologist-supervised	5,642	14,672	70,424
Provincial Laboratory	24,996	27,625	29,336

NOTE: Figures refer to monthly averages.

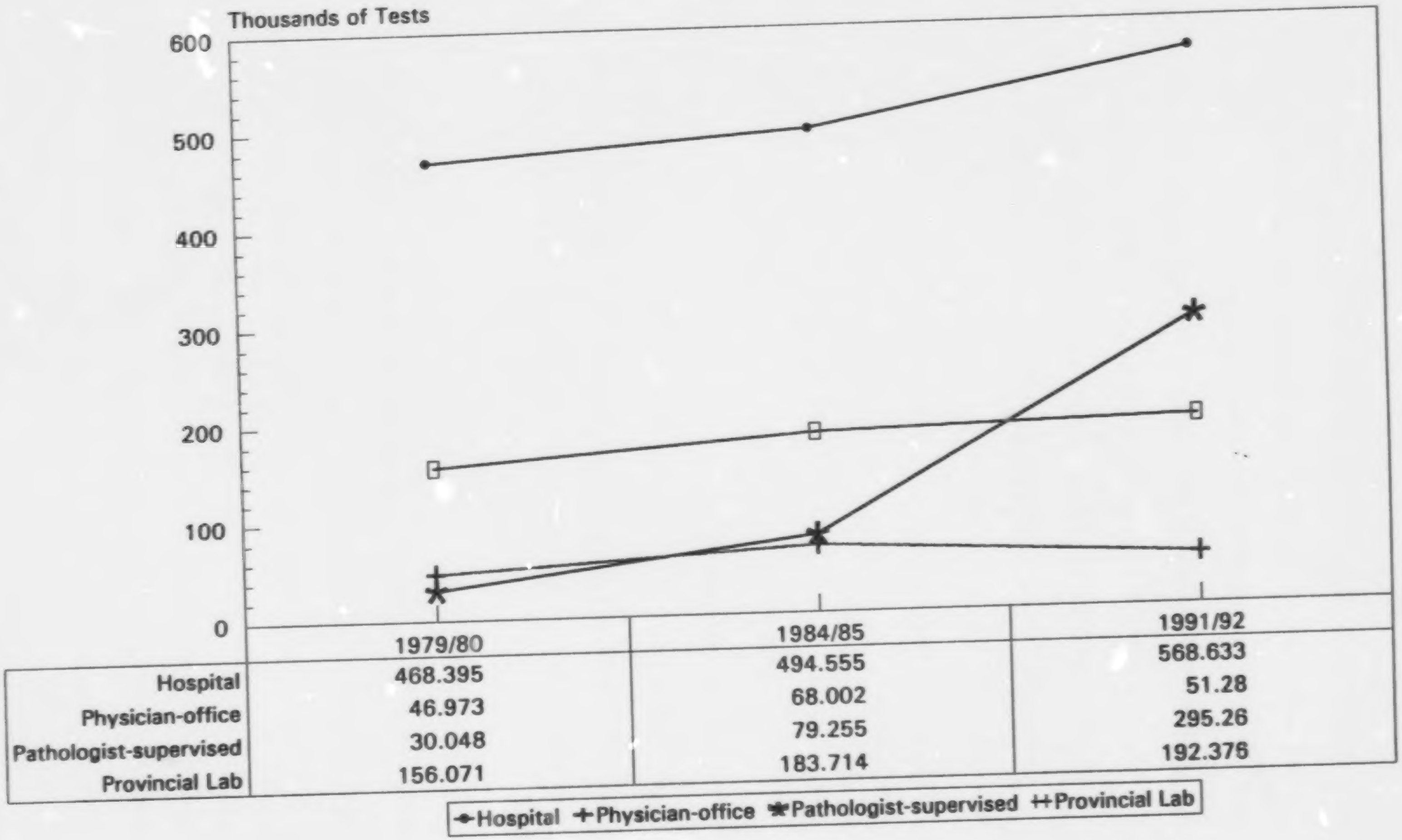
SOURCE: M.C.I.B.

Total Hematology



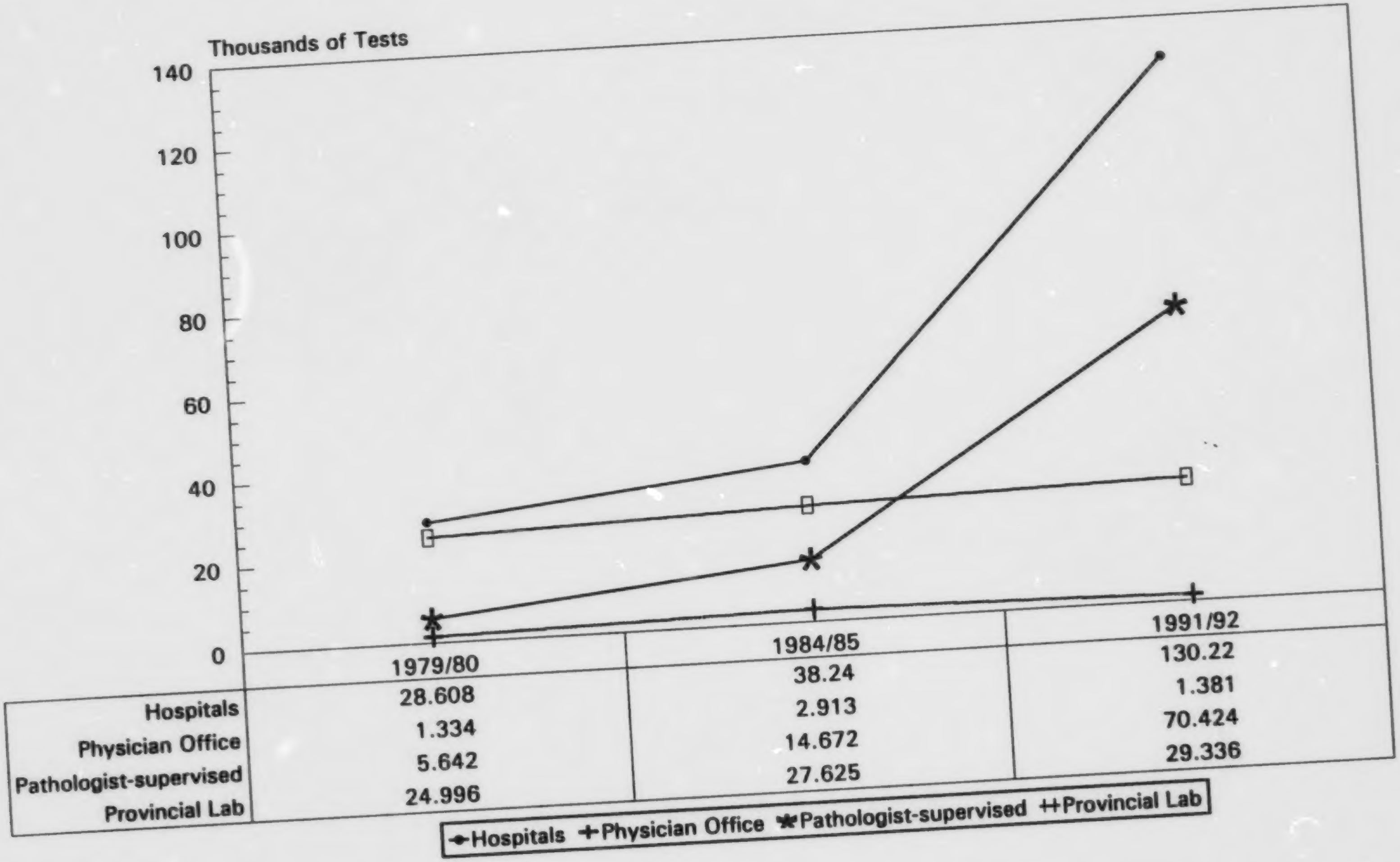
	1979/80	1984/85	1991/92
Hospitals	234.328	296.178	495.929
Physican Office	45.549	64.427	56.18
Pathologist-supervised	43.776	61.539	146.481
Provincial Lab	0	0	0

Total Biochemistry



	1979/80	1984/85	1991/92
Hospital	468.395	494.555	568.633
Physician-office	46.973	68.002	51.28
Pathologist-supervised	30.048	79.255	295.26
Provincial Lab	156.071	183.714	192.376

Total Microbiology



	1979/80	1984/85	1991/92
Hospitals	28.608	38.24	130.22
Physician Office	1.334	2.913	1.381
Pathologist-supervised	5.642	14.672	70.424
Provincial Lab	24.996	27.625	29.336

It is evident that while the increases in total costs and numbers of laboratory tests are most dramatic among pathologist supervised private laboratories, there has been a general increase in utilization throughout the entire system, public and private. The problems are therefore systemic, and the fact that the increase in utilization has disproportionately appeared in the private sector is probably, for the most part, due to private laboratories offering a convenient, accessible service rather than their applying pressure to do more work.

As in any system there are multiple factors which govern costs. In the health care field there are two major issues which give rise to concern in any debate over costs, namely volume and quality of service. In this review attention will be given to both areas. The management of the system will be examined, as will the funding methodology.

The total cost of the provision of laboratory tests is a function of the cost per test multiplied by the number of tests performed. The cost per test is a difficult factor to determine. In fact, all attempts at reaching consensus on the relative costs per test between, for example, public and private laboratories have failed. There are a several reasons for this failure among which are the differences in funding between public laboratories (where the fixed costs are only estimated and a 24 hour stat service must in most cases be provided) and private laboratories (which have been set up as dedicated businesses serving a particular market segment). In addition, public laboratories are funded on the basis of workload units with the number of units per test varying between different laboratories, while the private laboratories are funded on the basis of a specific price per test negotiated by the SMA with MCIB.

4. CURRENT FUNDING MECHANISMS AND ORGANIZATIONAL STRUCTURE

The current system of funding for diagnostic laboratory services in the province is trichotomous; hospital laboratories are funded within the global framework of the hospitals providing the service; the Provincial Laboratory is funded on the basis of a block grant; and private laboratories are remunerated on a fee-for-service basis. This three-legged approach to funding of what amounts to a single service within the health care system has contributed to the development of an excessively costly service.

There are also anomalies in payment for service. An example of such an anomaly is the situation in many communities where the local hospital performs the bulk of outpatient testing in the absence of a Category 3 laboratory. In such communities there may exist Category 1 and Category 2 laboratories billing MCIB on a fee-for-service basis for an unplanned number of tests. Additional unplanned tests may also be provided to the community by the Provincial Laboratory. In communities where there exists one or more private Category 3 laboratories, outpatient testing may be provided in any combination of all five types of laboratories. Provision of any service in such an unplanned and fragmented fashion leaves the service exposed to the possibility of inefficiency, ineffective monitoring of utilization and quality, and the development of excess capacity. All these things have occurred.

Each hospital has developed its own laboratory service to serve its inpatient population. The hospital laboratory system has been subject to a budgeting system within the global hospital budget. The hospital, within its global budget set by the provincial government, has been given an amount for laboratory services which is heavily influenced by previous laboratory workload. The amount actually spent by the hospital on its laboratory services, however, has been influenced by the allocation of funds by management within the hospital. Traditionally hospitals have confined their laboratory services to those required by inpatients, although in some areas of the province hospitals provide a significant service within their budgets to the outpatient sector. Within the hospital sector, however, there has been virtually no co-ordination of operating budgets and service delivery. There has been no co-ordination between hospitals in the acquisition of capital equipment or supplies, and there has been little control exerted by the Department of Health in this area, with the exception of a few examples of inter-hospital cooperation. This has led to the provision of space and the purchase of equipment in excess of that needed to process tests generated by the inpatient load.

Modern laboratory equipment is, to a large degree, designed to process large numbers of tests on a continuous basis. The pattern of laboratory utilization in acute care hospitals is such that the bulk of testing occurs in the morning leaving equipment and space unused, or under-used, for the balance of the 24-hour period. On the other hand the pattern of use of laboratories devoted to outpatient work is such that the bulk of work is conducted in the afternoon and evening. These laboratories have also invested in space and equipment which lies idle for much of the 24-hour period and for the entire 24 hours at the weekend and during holidays.

In order to quantify the degree of over capacity within the laboratory system the director of each Category 3 and major hospital laboratory in the province was asked to give an estimate of excess capacity in their laboratory. One can only conclude that there exists a significant excess of laboratory capacity. This excess capacity inevitably inflates the overall annual cost of hospital-based diagnostic laboratory services which has reached $43.5M. Space, equipment and support staff are duplicated. The skills of technologists and pathologists are often not efficiently used.

The Provincial Laboratory has also been under some degree of budgetary constraint. Its budget, however, has also been based on previous work done. The functions of the Provincial Laboratory have not been confined to support of the Public Health Service of the province but have included the provision of a diagnostic testing service to rural hospitals in the main. Traditionally the Provincial Laboratory has encouraged growth in this area and its activities have been funded on the basis of a block grant, which has reached the level of $7.5M per annum. Again there is no evidence of any co-ordination of service delivery or equipment acquisition with other laboratories in the province. Any budgetary constraint has been dealt with by improving productivity rather than curtailment of service.

The private sector, funded on a fee-for-service basis, has not been under any budgetary control. Billings to MCIB are open-ended. This is not to say no responsibility for costs has been carried. Physician laboratory utilization patterns are monitored and reviewed by the Joint Professional Review Committee of the MCIB and the College of Physicians and Surgeons. This committee, however, is more concerned with the detection of cases of abuse and fraud than with financial control. One result of this open-ended system has been the steep rise in costs in this sector as compared with those of the hospital and Provincial Laboratory sectors. As was indicated above, the cost of the private sector is now $20.1M annually.

The implication of the lack of an integrated organizational and funding structure is that there is no individual, group or body within the health care system which is managing, or is capable of managing, the laboratory system in Saskatchewan. As a result, the taxpayers of this province are not getting value for the $71.1M annual cost of the system. The waste of resources takes the form of unnecessary testing, the costs of maintaining excessive productive capacity, and systemic problems arising from the lack of integration within the public sector.

The first two types of inefficiencies have been documented earlier in this report. An example of the latter is the role the Provincial Laboratory serves in providing laboratory services to various health care institutions throughout the province. Samples are often transported to Regina for testing even if there is a more proximate laboratory facility with unused testing capacity. A case in point is the operation of the laboratory in the Saskatoon Community Clinic. This laboratory receives a budget of $300,000 per year from the Clinic. All tests which are not performed by the laboratory are referred to the Provincial Laboratory despite the fact that the Clinic is situated within two miles of three hospitals which, according to their respective laboratory managers, all have a great deal of excess capacity. This example is by no means unique but serves to illustrate the lack of management of laboratory services even within Saskatoon, a large urban centre which has a single body (the Saskatoon Health Board) responsible for the provision of in-hospital laboratory services.

The suggestion was made to the panel that hospitals have not taken on outpatient work because of the way in which the Workload Measurement System (WMS) funding operates. First, there has typically been a three year funding cycle, which implies that if they take on more testing there will be a time lag before funding catches up with the increased workload. Second, the WMS system bases funding on the performance of tests and not the acquisition of specimens or distribution of test results. Thus, many argue that given the time lags in funding and since hospitals are not funded to provide more a convenient service, including establishing remote bleeding stations, providing quick turnaround times and so forth, they in effect have been prevented from competing with the private sector laboratories and the Provincial Laboratory for outpatient work.

The funding mechanisms are not entirely to blame for the current situation, nor even the major cause of the problems. The fragmentation of both the system as a whole and within the public sector, and to some degree, the attitudes of players within the system are the primary reasons for the problem. There is nothing which prevented hospitals from requesting special funding from the Department of Health to allow them to take over outpatient testing in their districts. In fact, some hospitals have been relatively aggressive in trying to capture some of this work. However, most hospital administrations are not interested in this work because the rationalization of the system on either a provincial or a district basis is not their responsibility. The Department of Health turned down some of the requests that were made, perhaps due to problems in transferring funding between MCIB and the hospitals branch of the Department of Health.

We believe that a cost effective diagnostic laboratory service can only be achieved within an integrated management and funding system.

5. ESTIMATED MAGNITUDE OF AVAILABLE SAVINGS

The implications of the lack of an integrated management system for Saskatchewan's diagnostic laboratories were described earlier in this report. One of these is the poor quality of available information which seriously impairs any attempt to quantify the savings that could be realized through rationalization. The time made available to conduct this study was not sufficient to address the problems of a lack of comparability between the private and public sectors, gaps in information available, and so forth. However, over the course of the period of study, the Committee was able to collect information from the Department of Health as well as various providers of laboratory services in the province which allow at least a preliminary estimation of the savings available in the system.

The weaknesses of the estimates are evident and will be discussed in the presentation below. However, the Committee believes that the magnitude of the potential savings from rationalization is sufficient to justify both the introduction of an integrated information system and further detailed study of how diagnostic laboratory services may be more effectively delivered throughout the province. At a minimum, the following examples should serve to illustrate the magnitude of available cost savings.

It should be stressed, however, that while the examples described below are specific to a particular form of rationalization, usually the amalgamation of all services into a single district laboratory, by presenting these particular examples we do not necessarily endorse the specific forms of rationalization on which they are based. The actual structure of a rationalized delivery system may leave outpatient testing, in whole or in part, within the private sector. Rather, the intention is to use the body of work that is available to generate a reasonable expectation of the size of savings that could be achieved.

EXAMPLE 1 - MIDWEST HEALTH DISTRICT

Several communities in the Rosetown area have been actively working toward the creation of a local health district which could include the health care facilities in the following communities: Beechy, Dinsmore, Elrose, Kyle, Lucky Lake, Milden and Outlook. At the time this report was being prepared, it was uncertain whether Outlook would be included in the district; however, for the purpose of demonstrating potential savings, its inclusion or exclusion is not significant.

The justification for having laboratory facilities in the communities other than Rosetown (excluding Outlook) is that these facilities need stat capabilities to satisfy the requirements of their acute care facilities. However, the Committee was not convinced that closing the laboratory facilities in the smaller hospitals would affect the well-being of patients or the type of care that is provided. Therefore, we believe that a rationalization of laboratory services in the Midwest Health District would lead to the closure of the smaller laboratories, and amalgamation of their testing capacity in Rosetown.

If Outlook was excluded from the district, amalgamation would lead to increases in the Rosetown laboratory workload of 24.9% in chemistry tests, 40.5% in haematology tests, and 118.1% in microbiology. If the current staffing standards (97,000 workload units per FTE) were applied to the amalgamated laboratory, a total complement of 6.3 FTEs would be allocated to the facility. The current FTE complement in the entire district is 8.3 FTEs, implying a potential staff savings of about $65,400 per annum, or 13.5% of total staffing costs.

There are a number of other savings that could be achieved through amalgamation. There will clearly be redundant testing machines and other types of capital equipment. Amalgamation will free up facility space in the small rural hospitals as well as reduce the cost of providing professional managerial services and technical consultation to the Midwest Health District laboratory services. There would be savings on laboratory supplies as well as savings from Rosetown picking up some of the work from the District that is currently referred to the Provincial Laboratory.

On the other hand there would need to be an investment in a transportation service to move specimens from the smaller facilities to Rosetown and to provide a local or mobile phlebotomy service. There are reasons to expect that this is unlikely to present a formidable cost obstacle. First, there would be transportation savings from the specimens that are now referred to the Provincial Laboratory and could be performed by the Rosetown facility. Second, rationalization of health services on a district level would create opportunities for other types of savings (eg. laundry) which could be achieved if a transportation network was in place. The investment in support structures for a District management system will be spread over a number of services, including diagnostic laboratory services. Finally, Rosetown already has established a transportation link to Saskatoon and many specimens that are currently sent to the Provincial Laboratory could be sent to Saskatoon within the existing network after having been shipped to Rosetown.

In summary, we believe there is opportunity to achieve significant cost savings without reducing the quality of diagnostic laboratory services in the proposed Midwest Health District. It likely that these savings will also be available in comparable rural health districts.

EXAMPLE 2 - SASKATOON

An estimate of the potential savings in the Saskatoon area may be derived from the following:

a) The Committee received a brief that suggested the total savings from rationalization of the hospital sector (inpatient laboratory services) alone was about $2M per annum.

Savings: $2.000M

b) In a document presented to the Department of Health, the Royal University Hospital claimed to be able to take over outpatient services in Saskatoon for $5.597M, which includes the development of a courier system, an information system and setting up remote phlebotomy stations. Assuming the figures are correct, this compares with the current total private laboratory (Category 3) billings in Saskatoon of $7.651M and an additional $0.3M spent on the laboratory in the Saskatoon Community Clinic.

Savings: $2.354M

ESTIMATED TOTAL SAVINGS: $4.354M

This figure is based on estimates that were previously performed, and thus relies on the accuracy of those figures. However, the size of the estimated savings from rationalization is substantial. Even if rationalization was limited to the closing of redundant bleeding stations, savings would be significant. In the document titled Needs Assessment (see Appendix F), eleven satellite laboratories were identified as offering no significant improvement in the level of convenience due to their close proximity to existing facilities. Information received by the Committee estimated the annual cost of operating a bleeding station to be between $104,000 and

$140,000. Assuming a cost savings of $122,000 per station per annum, total savings would be $1.342M.

It may be argued that the recent amalgamation of the private sector laboratories will lead to rationalization of at least the outpatient system. However, at present such a rationalization will not reduce the cost of laboratory services to the taxpayer given the fee-for-service funding schedule. Furthermore, the figures strongly suggest that rationalization should not be limited to outpatient testing but rather should be applied to the entire diagnostic laboratory service.

EXAMPLE 3 - REGINA

The Committee learned that subject to appropriate increases in staffing, the potential capacity at the Regina General Hospital (RGH) laboratory is easily sufficient to handle all outpatient testing in Regina in addition to its current workload. It was even suggested that a significant increase in workload could be handled in some areas without increases in staffing.

The potential savings from rationalizing the delivery of laboratory services in Regina can be estimated as follows:

a) Closing the laboratory in the Plains Health Centre (PHC).
   The PHC currently serves as the trauma centre for Regina and whether the closure of its laboratory is possible depends on the role it will play in the future. The operating budget for the PHC laboratory (staffing,

supplies and medical pathology) is currently $2.472M. If the laboratory facility was reduced to a bleeding station, operating costs would be lowered to $0.122M per annum.

Savings: $2.350M

b) Closure of five satellite labs.

In the Needs Assessment document (see Appendix F), five satellite laboratories are identified which are in close proximity to existing laboratory facilities and would not have met the needs assessment criteria in the Medical Licensing Act.

Savings: $0.610M

c) Outpatient laboratory testing.

It was indicated to the Committee that the RGH has the equipment capacity to handle all outpatient testing in the city. While a detailed proposal to take over this responsibility has not been prepared by the RGH, it is reasonable to assume that the proportion of savings that is suggested to be available in Saskatoon (see above) in outpatient testing is also available in Regina (27.13%). Total Category 3 private laboratory billings in Regina amounted to $8.050M, a figure which excludes an estimate of billings for outpatient testing performed by Regina-based private laboratories for tests ordered for Moose Jaw residents ($0.592M).

Savings: $2.184M

ESTIMATED TOTAL SAVINGS: $5.144M

EXAMPLE 4 - MOOSE JAW

The laboratory facilities in Moose Jaw (population 34,130) include seven physician office laboratories, three processing laboratories and seven bleeding stations. One bleeding station is operated by a private laboratory in Regina, where most of its testing takes place. The savings from delisting physician office laboratories was previously estimated. We were informed that Moose Jaw Union Hospital has the ability to take over private laboratory testing in Moose Jaw, which amounts to an estimated $0.884M.

In addition, the managers of a Moose Jaw laboratory service should consider seriously the closure of one of the hospital laboratories. The Needs Assessment document suggests the volume of testing at Moose Jaw requires only one processing laboratory and fewer bleeding stations than currently exist. A conservative estimate of total savings available is $1.0M.

ESTIMATED TOTAL SAVINGS: $1.000M

EXAMPLE 5 - PRINCE ALBERT

Information received by the Committee suggests that Prince Albert Victoria Union Hospital could perform all outpatient laboratory testing with a capital injection of $0.092M (annualized cost of $0.010M) and an operating budget of $0.531M per annum. Current private Category 3 laboratory billings in Prince Albert amount to $1.667M, which includes some work performed for small rural hospitals but does not include billings for tests performed in physician office laboratories.

ESTIMATED TOTAL SAVINGS: $1.126M

EXAMPLE 6 - DELIST CATEGORY 1 AND 2 LABS

Total billing by Category 1 and 2 laboratories in 1991/92 was $2.227M. While it may be argued that some of the laboratories in these categories provide the only available local service in small rural communities, this argument can only apply to a small minority of these facilities. Only 79 of 203 Category 1 laboratories and 4 of 24 Category 2 laboratories are in rural areas and many of those are located in a community which already has a small hospital laboratory. In our opinion the workload that would spill over into other facilities could be easily absorbed by existing staff and equipment. If we allow 20% of the total billings for supplies and other incremental costs, total savings will be 80% of this figure.

ESTIMATED TOTAL SAVINGS: $1.782M

SUMMARY

The existing laboratory system in Saskatchewan has a great deal of excess capacity. It has been suggested that the cause of this excess capacity was the creation of private laboratories which duplicated facilities in order to capture the outpatient testing market in the larger urban areas. However, we believe that the problem of overcapacity is also present within the public sector and savings from rationalization can also be realized in the rural districts and within the public sector in the larger urban areas. While the actual amount of savings available is debatable, we believe that the estimates listed above are of sufficient magnitude to suggest that significant savings are available through the rationalization of the public laboratory service sector as well as the integration and rationalization of inpatient and outpatient testing. The above examples identified a potential saving of $13.406M (excluding the Midwest Health District) which excludes any savings from rationalization of laboratory services in rural Saskatchewan and is independent of changes in the level of utilization. It should be noted here that the Committee heard from numerous sources that the conventional wisdom is that some 30% of laboratory tests are clinically irrelevant. Our feeling is that even without a serious attempt to affect utilization, the provincial diagnostic laboratory service could be delivered with a total budget in the range of $50M - $55M, or between $50 and $55 per capita.

There is a very clear rationale for developing a health care administrative structure which results in the management of the entire provincial laboratory service and for creating an information base which allows the management to be effective and efficient.

In order to obtain the reductions in costs demonstrated above as examples, there will be a need to re-deploy personnel and, unfortunately, to reduce staffing levels. Such personnel changes will present a major challenge to the District Health Boards as well as the Department of Health. In many cases, there will be additional one-time costs related to staff severance packages and relocation expenses. These costs are impossible to estimate at the present time as the final architecture of the laboratory system cannot be determined until the final contracts for service have been met.

6. THE CONTROL OF LABORATORY UTILIZATION

The second multiplier determining the total cost of the delivery of laboratory services is the number of tests performed. Accompanying data demonstrates the growth in both inpatient and outpatient testing. The volume of inpatient testing is relatively stable, whereas the volume of outpatient testing has risen at a rate out-stripping the rise in medical services in general. This rise in the volume in testing has not been accompanied by any evidence of improved health care for patients. Indeed, there is no evidence to justify the volume of testing which existed prior to the large increases of the past five years. For twenty years there has been documented disquiet at the apparent over-utilization of laboratory testing in North America. For twenty years ideas have been forthcoming in the literature directed at improving the appropriateness of laboratory testing. In addition to the issue of the appropriateness or otherwise of initial testing there arises the issue of the duplication of tests already performed. Duplication of tests within a short time of their initial reporting is estimated by the private laboratories to be responsible for approximately 5% of testing in the outpatient sector. A study conducted by the Department of Health in 1992 indicated a 5.8% rate of duplication at one private laboratory during a four-week period after initial testing in the outpatient sector. For the nine tests included in the study, duplicate testing at the private laboratory represented a cost of $331,670 during the year 1991/92.

A review of the literature from 1971 indicates that for the past twenty years concern has been expressed over the rise in the frequency and cost of laboratory testing in North America and in Europe. For example, Griner and Lipzin (1971), writing in the Annals of Internal Medicine, make the following comments:

> "A 27% increase in the number of laboratory studies in patients hospitalized with the diagnosis of diabetic ketoacidosis between 1966 and 1969 did not affect the outcome of care as determined by the length of these patients' hospitalization."

> "As new and more complex laboratory tests are introduced, laboratory costs will remain disproportionately high unless physicians, who are more directly responsible for these than for other hospital costs, make efficient use of the laboratory."

> "In an era when little laboratory work is performed by the physician and increasing conveniences are available (phlebotomy teams, cumulative laboratory sheets, automated procedures, and so forth), an open invitation to excessive use of the laboratory exists."

These authors also make a comment worth noting by those who believe the probability of malpractice suits is sufficient justification for diagnostic testing beyond the medical needs of patients:

> "In addition, the frequency of iatrogenic complications in hospitalized patients is proportionate to the number of tests and procedures performed."

Krieg, Gambino and Galen (1975) make the comment,

> "Apparently, laboratory studies are not always selected with care, and results are not always used to benefit the patient."

Lacombe (1974) recommends that physicians ask three questions when contemplating the ordering of a test:

1) Will results of this test change the diagnosis, prognosis or therapy?
2) Will results of this test provide a better understanding of the disease process in this patient?
3) What am I looking for and why? Will the patient benefit if I find it?

Kassirer and Pauker (1978) state,

> "We believe that a notable reduction of inappropriate testing would result if students, house officers and other physicians were taught the fundamental principles of making medical management decisions. In fact, these concepts, based in part on probability theory and decision analysis, should form the basis for any rational approach to the use of diagnostic laboratory tests in both individual patients and generic clinical problems."

The literature gives multiple examples of inappropriate ordering of laboratory tests and contains many suggestions for reform. Later in this document proposals will be made towards influencing physician ordering patterns towards a gold standard of using the optimum test pattern for each clinical situation. Optimum would be in terms of quality of care and utilization of resources. Unfortunately most of such mechanisms will produce results only in the long-term. The current budgetary situation with regard to laboratory testing in the province requires short-term strategies as well as the long-term.

Apart from the issue of medical uncertainty as a contributing factor in the generation of inappropriate testing, there remains the issue of the effect on physician ordering patterns of fee-for-service remuneration itself. There is a widespread belief that the fee-for-service system of remuneration in health care carries with it a major incentive for over servicing. Certainly there is no incentive for constraint, particularly so where the system of payment is open-ended without any budgetary control.

In order to test the theory that the private fee-for-service laboratory sector may be more costly, not in the delivery of any particular laboratory test, but in the delivery of a diagnostic laboratory service to a population, the costs of outpatient diagnostic laboratory services in two regions were compared. The two regions chosen were Swift Current, which is not served by a Category 3 laboratory but does include some Category 1 and 2 laboratories, and Prince Albert, which is served by a Category 3 laboratory. It is recognized that both regions may send work to the Provincial Laboratory, but the volume of that work was unobtainable. The study showed an outpatient laboratory cost per 100 population of $1371.99 in Swift Current and $2336.98 in Prince Albert (see Appendix E).

Given the difficulty in accounting for the rise in numbers of tests performed and the lack of evidence of appropriateness in their ordering, it would be reasonable to subject the delivery of laboratory tests to more intense budgetary control.

7. RECOMMENDATIONS

In view of the fact that the appropriate numbers of tests needed by any population is unknown, it is not possible to budget effectively on the basis of a projected number of tests or laboratory workload units to be consumed by a given population. Multiple factors govern the consumption of any health care resource with actual health care need being undefinable, and in any case, fairly low on the list of cost driving forces. In Canada health care cost constraint has been most successful in areas subject to global budgeting. This will continue to be the case provided global budgeting is supported by firm management and the elimination of end runs. It is clear that the provision of laboratory services within the province, if costs are to be contained, requires a comprehensive system of global budgeting. There is no question that utilization management systems need to be incorporated into the diagnostic laboratory field, but the success of such systems will depend upon the installation of information systems, the development of test ordering protocols, educational programs for physicians and the development of a province-wide monitoring system. All these initiatives will take time to develop and implement. Their potential for success in containing costs, at the present time, is uncertain. The need to gain control over the management and costs of the diagnostic laboratory service carries some degree of urgency. For these reasons it is important for the province to make a decision on the amount it is willing to spend on laboratory testing in the province and allot that amount to the appropriate governing bodies. The budgetary allocation for the District Health Boards and the remaining areas of the province should be based on a per capita grant adjusted for relevant demographic factors.

Recommendation 1:

EACH DISTRICT HEALTH BOARD TO BE PROVIDED WITH A BUDGET BY THE DEPARTMENT OF HEALTH FOR THE PROVISION OF LABORATORY SERVICES WITHIN ITS JURISDICTION.

Laboratory testing is provided to ambulatory patients in the community, patients confined to their own homes or to nursing homes, patients in physicians' offices, and hospital inpatient and outpatient services. The management of these different areas of the laboratory service is currently fragmented. There is evidence of duplication of service, duplication of equipment, duplication of testing, excess capacity, and duplication of manpower. In addition there is a lack of a concerted attempt to influence physician ordering practices. Laboratory services can be seen as a system within the health care delivery system and as such there is a need for the system to be under single management. Such management could be provided at a province-wide level with the establishment of a Diagnostic Laboratory Testing Utility (Sasklab) with its own board accountable to the Department of Health. Alternatively, management could be provided by each District Board, either as an independent department reporting directly to the District Board or delegated to a major hospital within the district. With the recent publication of the document "A Saskatchewan Vision for Health: A Framework for Change", the Government of Saskatchewan has demonstrated its commitment to the decentralization of health care management to the level of districts of not less than 12,000 people. The establishment of District Health Boards, with each one being responsible for the delivery of health care services within their district, creates an opportunity to rationalize the management of laboratory services at a local level and on similar lines.

The current laboratory management system, with each laboratory being managed separately has been wasteful. A superior system would be for the District Health Boards to take full responsibility for the delivery of laboratory services, with the establishment of a District Laboratory Service Department reporting to senior level management at the vice-presidential level. The Department would negotiate contracts for service with laboratories either within the district or with laboratories outside the district. Under the latter circumstances, services would be purchased from other districts. Whichever reporting mechanism is adopted, there is a need for financial accountability on the part of laboratory managers.

Recommendation 2:

EACH DISTRICT HEALTH BOARD TO EITHER ESTABLISH A DIAGNOSTIC LABORATORY SERVICE DEPARTMENT OR DELEGATE THE RESPONSIBILITY FOR THE MANAGEMENT OF THE DIAGNOSTIC LABORATORY SERVICE IN THE DISTRICT TO ONE OF ITS MAJOR HOSPITALS.

In order to establish a rational laboratory service of appropriate capacity it will be necessary to channel testing to those laboratories which can accommodate the workload of the district. Although the district will have a budget for laboratory testing, it will be expected that laboratories providing service will do so at the lowest possible price consistent with the delivery of service of a predetermined quality. District Boards may accept tenders from laboratories both inside and outside their jurisdictions for the delivery of laboratory services, or they may require that one or more laboratories provide all the necessary tests for the district. The range of laboratory tests available on-site in each hospital will be determined by the district laboratory manager. That person will determine the quality standards competing laboratories are required to meet in terms of accessibility to physicians and clients, turnaround time for results, range of tests, standards for transportation of specimens, and quality assurance standards and mechanisms within the laboratories. The objective behind this process will be to establish access in each district to stat testing for hospital inpatients and a cost-effective, centralized, efficient and high quality comprehensive laboratory service for the community, including hospital inpatients. It is expected that laboratories unsuccessful in obtaining contracts, or laboratories considered to represent unused capacity will be closed. It is also expected that unused equipment will be transferred to districts or laboratories requiring the equipment.

Recommendation 3:

DISTRICT HEALTH BOARDS TO CONTRACT WITH LABORATORIES TO PROVIDE DIAGNOSTIC SERVICES TO HOSPITALS AND TO THE COMMUNITY.

There is a widespread concept that the participation of private laboratories in the delivery of laboratory services is not consistent with a cost effective system. There is a suggestion that private laboratories sometimes produce an inferior quality of result. There is also a commonly held belief that private laboratories have no place in the ideological landscape of health care delivery in the province on the basis that they derive profits from public funds.

As has been demonstrated above, there is undoubtedly a relationship existing between the increase in penetration of the outpatient laboratory sector in urban areas by the private laboratories and the cost of serving that sector. The increase in the cost of this sector is undoubtedly due in part to the volume-increasing pressure exerted by the fee-for-service mode of remuneration. It is also due to the increasing convenience to both patients and physicians offered by the private laboratories by their opening of many bleeding stations in close proximity to the physicians' offices. This convenience is of value to the clients of the private sector and will be seen by many as an increase in quality of service. It is a convenience which the public sector has not often provided.

The quality of the laboratory testing in the private laboratories has been criticized by some, but no evidence of inferior quality in this sector has been forthcoming. Suggestions of inferior quality of testing among the different public laboratories are made, again without substantiation. The Committee does not consider itself in a position to comment upon the quality of work done in the different laboratories in the province. This issue is under the jurisdiction of the College of Physicians and Surgeons and the laboratory accreditation system. There is no reason to believe that that function is not effective.

Private laboratories are by no means the only organizations profiting from the health care system. Privately practising physicians billing MCIB on a fee-for-service basis are all small businessmen profiting from the health care system. At the present time, within the Canadian health care system, this is the norm. There are many other examples of private enterprise within the health care system. It would be inappropriate, therefore, to single out private laboratories for special treatment on ideological grounds alone.

The private laboratories are providing a service in the outpatient sector. They have built up a specimen acquisition and delivery system, developed management information services, have spare laboratory capacity, and have developed valuable management expertise. All these facets are potential assets to a rationalized laboratory system. The current funding system has provided private laboratories with incentives to provide service and to build an infra-structure to service the outpatient sector. Such incentives have been denied the public sector laboratories.

One objective of rationalizing the laboratory system is to provide a cost effective service. There is no question that the outpatient sector must be serviced, either by the private or by the public sector. In order that the service provided is cost effective, it should be provided by the laboratories which can do so at least cost for a given quality of service. There is no reason why private laboratories could not bid for contracts for service delivery provided funding methods for all sectors of the laboratory service were identical. In this respect, the freedom to acquire and to replace capital equipment would need to be equal within both sectors.

Contracts would be awarded either internally within the district's hospitals or to external providers using sound business principles, otherwise the health boards would be in danger of condoning poor management. Equally, it will be necessary in the awarding of contracts to be aware of the danger of being held to ransom in the future by any laboratory successful in obtaining a contract. Where laboratories are totally unsuccessful in obtaining contracts, they will close. There is the danger that successful laboratories will refuse to provide service to a sector within the budgeted price at the second or subsequent contract negotiations. Provided health boards are aware of this possibility, they may wish to split service contracts between laboratories. In the end, the health boards will have full control over their hospitals and, therefore, their laboratories. They can always insist on service from the public sector at a predetermined price.

Recommendation 4:

> **LABORATORY SERVICE CONTRACTS TO BE AWARDED ON THE BASIS OF BEST PRICE AND COMPLIANCE WITH QUALITY STANDARDS TO BE ESTABLISHED PRIOR TO TENDERING.**

The direction chosen by the province in the reform of its health care system is one of decentralization with the creation of a series of District Health Boards, of which three have already been created. Each District Health Board will be responsible for the delivery of all components of health care to the district population. This structure lends itself to the administration of a single rationalized laboratory system in each health care district of the province.

The establishment of district boards throughout the province will take time. At present the established district boards are heavily involved in developing their structure. Until such time as district boards are established and are able to carry the responsibility for the provision of laboratory services, the laboratory services will be administered as a discreet service by the Department of Health. In order to avoid fragmentation of management, the Department of Health would maintain a specific management structure reporting to the Associate Deputy Minister level. It is envisaged that this structure will gradually divest itself of laboratory responsibilities until such time as the Provincial Laboratory remains its sole charge.

Recommendation 5:

WHERE DISTRICT BOARDS ARE NOT YET ESTABLISHED, THE DEPARTMENT OF HEALTH TO CONTRACT FOR THE PROVISION OF LABORATORY SERVICES WITHIN DESIGNATED GEOGRAPHICAL AREAS USING, AS A BASE, THE BUDGET FOR LABORATORY SERVICES ALLOTTED TO THOSE POPULATIONS.

Even if an integrated management system were in place, deficiencies in available information would make effective management impossible. The data collected from the private sector includes actual tests ordered, the physician ordering the tests, and the costs to the taxpayer of private sector tests after the application of the MCIB fee schedule. The public sector reports the workload units generated by the laboratory and the Department's budgetary allocation to the laboratory (not necessarily actual expenditures) is known. The Department of Health does not receive information regarding which physicians are ordering the tests that are performed in the public sector and, in general, comparisons between the private and public sectors are extremely difficult to make.

Private laboratories measure workload in terms of numbers of tests reported. Public laboratories measure and report workload in terms of workload units, with the number of workload units allocated to any particular test varying depending on the method used to conduct the test. In addition workload units are consumed and reported for such activities as quality assurance, and specimen acquisition and transport. It is impossible, therefore, to translate accurately between workload units and volumes of tests. In addition it is impossible, on the information currently available, to define the costs of tests in any particular laboratory.

The owners of private laboratories, where all the expenses including fixed costs are known, are unable to place an accurate cost on the provision of a result on any particular test. In the public sector, where fixed costs are not necessarily allocated to laboratories, and where plant, staff and equipment may be required to be available on a stat basis for the provision of a relatively low percentage of total workload, it is impossible, again with current information, to derive the cost of individual tests. The provision of laboratory tests in the province accounts for 4.4% of total health spending, or $71.1M per annum, with the private sector, servicing a major portion of the outpatient sector, accounting for $20.1M. It is important to understand exactly how this large amount of money is being spent. It will be extremely difficult to enlist the aid and co-operation of physicians in reducing the cost of the provision of laboratory services if management continues to fail in its attempts at cost identification. As will be discussed below, physicians are willing to modify their test ordering behaviour when they are aware of the cost of testing. At present it is only possible to estimate the costs for each individual test. There is a need for budgeting and other managerial reasons to have the capacity to compare cost efficiency between laboratories within Saskatchewan and with laboratories outside the province.

Recommendation 6:

> **THE COSTING OF TESTS AND THE REPORTING OF WORKLOADS BY LABORATORIES IN THE PROVINCE TO BE STANDARDIZED IN ORDER THAT EFFECTIVE COMPARISONS CAN BE MADE BETWEEN LABORATORIES BOTH WITHIN THE PROVINCE AND BEYOND.**

Coupled with the current difficulties in costing individual tests is the difficulty in tracking tests actually performed. The tracking and recording of tests performed and results generated is essential to serve the following purposes:

a) Registration of cases, e.g. screening cytology;
b) To provide information to physicians and hospitals on previous testing of patients in order to avoid duplication of testing for the same purpose, and to demonstrate trending of results;
c) To monitor laboratory utilization patterns of patients, physicians and hospitals to provide a basis for efforts directed at behaviour change, and to facilitate the future planning of laboratory services;
d) To provide rapid access to results;
e) To provide on-line cost information to users (managers and physicians);
f) To avoid the necessity for repeated registration of patients;
g) To facilitate recall of patients for repeat testing, e.g. Pap smears;
h) To allow for research into laboratory utilization.

The installation of a province-wide laboratory information system is technically possible. The system envisaged would allow for access by all physicians to the results of laboratory tests on their patients and would be on-line to all laboratories for data input. It is estimated that at least 5% of all laboratory tests are duplications. If these duplications were eliminated by the introduction of an information system, then $3.5M would be available annually from this source alone towards the information system. In addition, the Provincial Laboratory has already embarked upon a similar system at a cost of $1M.

Cost estimates for the development and installation of a province-wide laboratory management information system provided to the Committee by Saskatchewan Health indicate development costs of $1.7M and annual operating costs of $3.7M. Such a system would be similar to the Prescription Drug Plan system and would give each provider (laboratory) and each user (physician, hospital) on-line real time access. A scaled down version could be made available for an estimated development cost of $1M and an annual operating cost of $0.5M. Such systems could also be used to support a province-wide diagnostic imaging service.

Recommendation 7:

A PROVINCE-WIDE DIAGNOSTIC LABORATORY INFORMATION SERVICE TO BE DEVELOPED WITH ON-LINE ACCESS PROVIDED TO PHYSICIANS' OFFICES AND HOSPITAL OUTPATIENT AND EMERGENCY DEPARTMENTS.

Until 1991, laboratory medicine in Saskatchewan was largely unregulated. In that year, the Medical Laboratory Licensing Act came into force, largely as a result of a recommendation of the Lone-Warren Report. The Medical Laboratory Licensing Program was developed under the Act as a partnership between the College of Physicians and Surgeons of Saskatchewan and the Department of Health. The College established six quality assurance committees to develop standards of practice for laboratories. The Laboratory Licensing Unit of the Department of Health was responsible for the administration of the program. A Medical Laboratory Licensing Board made final decisions from the recommendations forwarded to them from the College and the Needs Assessment Committee, a subcommittee of the Board.

Due to concerns of several stakeholder groups the Laboratory Licensing Program was reviewed in April of 1991. As a result of this review there exists an intention to amend the Act and the Regulations. Effective October 1, 1991 the Medical Laboratory Licensing program was modified in such a way as to establish a laboratory accreditation program under the leadership of the College. A committee structure was established to provide stakeholder input into the accreditation process and into standard development in the areas of quality, qualifications of staff and the Needs Assessment process.

Each laboratory conducts its own quality assurance program. Pathologists stand out among their physician colleagues in Canada in their willingness to embark upon peer review processes and quality assurance programs within their own workplaces. The pathologists of the province match their colleagues elsewhere in this regard. In the wider area of laboratory utilization management pathologists have not taken a leadership role. In any discussion of laboratory utilization there emerges a cascade of blame, with no evidence of any willingness to carry responsibility for the rapid rise in the cost of delivery of laboratory services. Everyone claims that much of laboratory testing in the province is inappropriate, with an unsubstantiated figure of 30% being frequently mentioned. The laboratory technologists claim to be intimidated into not reporting to their pathologists what, in their opinions, are violations of reasonable ordering practices. The pathologists claim they are not in a position to question physician ordering practices because they have not examined the patient, but blame the clinicians for over-utilization. The clinicians blame the patients for demanding unnecessary tests, and malpractice lawyers for implied support of unaccommodated patients. Most blame the private laboratories.

Pathologists are the experts in the field who have the knowledge and expertise to assist practising physicians in the ordering of appropriate tests in common clinical situations. They have the knowledge to educate their colleagues and the public on the costs, functions and capabilities of laboratories under those common clinical circumstances. The Saskatchewan Association of Pathologists has not taken a leadership role in developing a rational laboratory service in the province. This organization sees itself as having a social and educative function among pathologists. Individual pathologists appear to be competitive and often involved in conflicting professional endeavours.

Apart from the quality of laboratory testing and ordering, there arises the quality of service to the clients. In some communities the private laboratory service provides ready access to specimen acquisition either in the physicians' offices or in bleeding stations in close proximity to physicians' offices. Specimens are taken in patients homes and in nursing homes. In other communities, where the bulk of testing occurs in the community hospital or in the Provincial Laboratory, the patient often has to attend the hospital for specimen acquisition. There is not, therefore, a consistent standard of convenience for patients.

There is some evidence to show that too much convenience encourages an increase in testing. If this is the case, and because bleeding stations and unnecessary tests are expensive and wasteful, it may be appropriate to reduce easy patient access to testing. The question arises then of how many bleeding stations are appropriate in a community.

The turnaround time of testing is the time which elapses between the physician ordering a test and his receiving the result of the test. Much is made of this issue, with laboratories priding themselves on fast turnaround times and on using their ability to provide short turnaround times as a competitive factor. Certainly fast turnaround times are often important, as in response to a stat order in an intensive care unit. In other cases, however, a fast turnaround time will contribute nothing to patient care. A patient having a Pap smear is being screened for a disease process which, in any individual, is unlikely to be present, and which, if present, does not need to be treated as a matter of urgency. A turnaround time for such a test of one or two weeks would be reasonable. Similarly, such a test as a serum cholesterol will provide information to the physician and to the patient on an absence of disease or on the presence of a condition which is managed in the leisurely fashion characteristic of dietary intervention. There is no need to see a rapid turnaround time of this type of test as being a necessary adjunct to good patient care. If a rapid turnaround time increases cost, and it clearly does. then decisions need to be made on appropriate turnaround times under different clinical conditions.

The establishment of laboratory testing protocols as guidelines for the ordering of tests is considered to be a rational approach to contain laboratory utilization. Such an approach has been advocated in the literature for many years.

Laboratories have acquired equipment independently with only the requirements of their own parent organization in mind. This has resulted in over capacity and a lack of standardization. Large amounts of capital funds have been consumed in the equipping of laboratories with instruments which stand idle for much of every day.

It is clear that leadership from the pathologists of the province in the development of a rational diagnostic laboratory service has been wanting. There is a great deal of suspicion and distrust and a lack of co-operation and communication at a professional level. There is a widespread feeling among laboratory technologists that they are not listened to and that they play an insufficient part in standard development in their own laboratories. Many feel intimidated in their professional relationships with the pathologists. There is a clear need for pathologists to understand and practise a more participatory management style in their laboratories, with further empowerment of their technical and management colleagues. There is a need for pathologists to communicate more with their colleagues on a professional basis in order to participate in the development of a rational, high quality laboratory service for the province. There needs to be much more co-operation and co-ordination between laboratories.

With the rationalization of the laboratory system there will be a reduction in the numbers of hospital laboratories. Many hospitals, small and large, will no longer have a laboratory on-site providing a broad range of services. It will be essential for district health boards and the Department of Health to receive good advice on the narrow range of services required to be available in hospitals which no longer have a full service laboratory. The appropriate range of tests available on-site will depend upon the geographical location in relation to full service laboratories and on the range of clinical services provided by the hospital. A suggested list of tests to be available in a stat lab would be: haemoglobin, blood glucose, blood gases, simple urinalysis. The Provincial Advisory Committee on Diagnostic Laboratory Services would advise on a similar list for each hospital.

Clinicians frequently wish to have a wide range of tests available on-site and will frequently make such demands. Provided a test result is available within a length of time appropriate to the clinical circumstances existing at the time of ordering, there is no reason for the clinician to concern himself with the site of testing. Requests for extension of the range of tests available in stat laboratories would be considered by the Provincial Advisory Committee on Diagnostic Laboratory Services and decisions made on the basis of sound clinical and managerial principles.

In order for the above issues to be addressed there is a need to create a provincial body accountable to the Department of Health. The body, or Provincial Advisory Committee on Diagnostic Laboratory Services, should be composed of senior pathologists, with at least one senior pathologist from out of province, senior clinicians, laboratory technologists, hospital administrators, representatives of the College of Physicians and Surgeons and of Government. The Committee would be charged with the responsibility for advising government and district boards on:

a) Laboratory management structures and techniques;
b) Laboratory testing protocols;
c) Laboratory quality issues including quality control standards, standards for transportation of specimens, standards of patient accessibility, standards for test turnaround times;
d) Assessment and approval of new tests based on measures of effectiveness and cost;
e) Continued assessment of the cost effectiveness of tests;
f) Discontinuation of obsolete tests;
g) Human resources, to include pathologist, technologist and support staff manpower requirements;
h) Equipment assessment and acquisition;
i) The range of services to be available on a stat basis to hospitals, the laboratories of which have been closed following rationalization.

It is recognized that many of these functions are envisaged for the reformed Medical Laboratory Licensing Program. The Provincial Advisory Committee on Diagnostic Laboratory Services would provide a key function within the Program and would replace the Medical Laboratory Licensing Board.

Recommendation 8:

A PROVINCIAL ADVISORY COMMITTEE ON DIAGNOSTIC LABORATORY SERVICES BE ESTABLISHED WITH THE MANDATE TO DEVELOP STANDARDS OF SERVICE AND MANAGEMENT FOR DIAGNOSTIC LABORATORIES.

As has been discussed above, laboratory tests are now purchased by the province in three ways. Tests are purchased by MCIB on a fee-for-service basis from physicians and privately-owned laboratories, with the fees for each test being set by MCIB following negotiation with the SMA. Tests are also purchased from hospitals through the global budgeting system of hospital remuneration of the Hospital Services Branch (HSB). The third source of tests is the Provincial Laboratory, which is funded through a block grant from the Department of Health.

As has also been discussed, the cost of production of tests in these separate areas is impossible to ascertain. Discussion with representatives of the SMA and of the private laboratories leads to the conclusion that the fees established are not well-related to the cost of production. In addition, there is no relation of the fee to volume of service. It is known, for example, that the cost per test of production of most tests where modern equipment is used falls with increase in volume.

The fee-for-service system of remuneration in health care is well recognized to contain powerful incentives to increase volume. This is no less true in the laboratory field. The increase in volume of testing in the fee-for-service sector over the past 10 years as compared with the increase in testing in the non-fee-for-service sector would support this argument. Even in the hospital inpatient field it has been estimated that as much as 30% of laboratory testing is of no value to patient care, and this is in an area where there is no impact of the incentives towards increase in volume inherent in the fee-for-service system. The large increase in test volumes in the fee-for-service sector without any evidence of an associated improvement in patient outcomes would suggest a great deal of ineffective testing in the field.

One of the major challenges in modern health care is to influence the utilization of increasingly scarce resources in such a way as to produce the optimal benefit to patients. In the laboratory field, where practitioners are able to order tests in laboratories they own (Categories 1 and 2) and at the same time profit from the testing, it is unlikely that tests will always be ordered in a way consistent with the principles of prudent utilization of resources. The incentive lies against the conservation of resources. Similarly, in laboratories which are not owned by physicians ordering tests, where fee-for-service remuneration operates, the supervising pathologists have no incentive to educate physicians in appropriate ordering patterns. Any reduction in ordering by referring physicians means a reduction in revenue for the laboratory. Depending on the pathologist's arrangement with the private laboratory, any reduction in revenue may be reflected in a reduction in the pathologist's income from the laboratory. This is particularly evident in the cases where the pathologist is the owner of the laboratory.

The activities of the private laboratories over the past few years have been directed at increasing business volume and consolidation. Business volume increases have been achieved by providing easier access to testing for patients and physicians. The establishment of large numbers of bleeding stations in close proximity to physicians' offices have provided convenience of access at the price of increased volume. The practice of purchasing physician-owned laboratories by the larger private laboratories was an example of consolidation with elimination of competition. In the business world such activities are designed to increase revenues. It would be naive to believe such activities in the laboratory testing field were not designed to increase revenues, or, because of fee-for-service, volumes. In an era such as exists at present, where there is an expressed need to curb utilization of health care resources, there is little place for such business practices.

Fee-for-service remuneration is confined to laboratories in the Categories of 1, 2, 3, and 4.

The excess growth in the cost of laboratory services in the private sector over that experienced in the public sector is almost certainly due to an increase in testing in the Category 3 and 4 laboratories, with the most rapid rise in the numbers of tests occurring in the period 1984/85 to 1991/92.

The impact on costs of the presence of private laboratories operating on the basis of fee-for-service is demonstrated by a comparison between the costs of laboratory services in the two communities of Prince Albert and Swift Current. In the former community, laboratory services are provided by private laboratories (Category 1, 2, 3 and 4), the Provincial Laboratory, and hospital laboratories, whereas in the latter community, there are no Category 3 and 4 laboratories.

Fee-for-service laboratory practice, then, encourages increase in volumes and, therefore, total costs. It discourages pathologists from taking a leadership role among their clinical colleagues directed towards encouraging the establishment of more appropriate laboratory ordering patterns. The conclusion of the Committee is that the fee-for-service mode of remuneration for laboratory tests should be abandoned.

Recommendation 9:

THE FEE-FOR-SERVICE BASIS OF LABORATORY REMUNERATION TO BE DISCONTINUED.

There may be a need in some cases for the doctor to have the capability to perform simple tests for his or her patients. The fact that there are only 203 Category 1 laboratories licensed, with only 91 of these being in rural areas where there is less easy access to more sophisticated laboratories and a total of 24 Category 2 laboratories, with only 7 in rural areas, suggests that the majority of the 874 general practitioners in the province do not believe a laboratory capability in their offices to be essential for the practice of quality medicine.

The current fee-for-service system encourages overservicing. The reliability of test results in Category 1 and 2 laboratories has been questioned, and suggestions are made that such laboratories are not subject to adequate quality control. There are also instances where there are Category 1 and 2 laboratories in close proximity to full service laboratories, sometimes even in the same building. The existence of these laboratories cannot be justified on the basis of patient convenience.

Simple tests should be considered a part of a patient examination and if they are performed in the physician's office, they should not be treated as an additional billable service.

Recommendation 10:

> **LABORATORY SERVICES IN PHYSICIAN'S OFFICES TO BE DE-INSURED AND WHERE BASIC TESTING (E.G. DIPSTICK TESTING AND PREGNANCY TESTING) IN PHYSICIANS' OFFICES ARE CONSIDERED BY THE PROVINCIAL ADVISORY COMMITTEE ON DIAGNOSTIC LABORATORY SERVICES TO BE APPROPRIATE, THE REAGENTS AND KITS BE PROVIDED BY THE DISTRICT HEALTH BOARD TO PHYSICIANS AT NO COST.**

At present the SMA negotiates the fees to be charged by physicians and pathologists for the provision of test results with MCIB. They are, therefore, negotiating on behalf of the private laboratories. Apart from the physician owners of Category 1 and 2 laboratories, which together bill a total of $2.2M per annum, the main beneficiaries of the SMA negotiations are the owners of the Category 3 and 4 laboratories. There are only two pathologists in the province who actually own a Category 3 laboratory. There are several pathologists who provide consulting services to private laboratories, which presumably compensate these pathologists by some method or another. It would appear, therefore, that the SMA is negotiating testing fees more on behalf of the owners of the laboratories rather than of the pathologists who provide the laboratories with their expertise. As far as one can ascertain there is no attempt on the part of the SMA to negotiate the terms and conditions of employment of pathologists with employers, be they private or public employers. In view of the fact that the greater part of the private pathologist managed laboratories are owned by a single private company, it would appear that the SMA is, to a major degree, negotiating prices on behalf of the shareholders in that company.

The SMA should be responsible for negotiating professional fees on behalf of its members, and those professional fees should only be paid for services that are personally furnished by a physician or pathologist and which normally require performance by a physician or pathologist.

Recommendation 11:

> **THE SASKATCHEWAN MEDICAL ASSOCIATION TO CONFINE ITS NEGOTIATIONS ON BEHALF OF PATHOLOGISTS TO THE NEGOTIATION OF SALARIES AND CONTRACTS WITH EMPLOYERS.**

Pathologists who are paid by the public to manage a public sector laboratory while maintaining a financial interest (as an employee or owner) in a private laboratory are in a clear conflict of interest. While the Committee has received no evidence of individuals abusing their position, the conflict places these individuals in an untenable position, producing suspicion and distrust and puts into question their ability to perform their jobs. For instance, there are examples of pathologists receiving full-time salaries for the supervision of large base hospital laboratories while at the same time receiving up to a 0.7 full time equivalent salary from another organization and playing a major role in the management of a private laboratory. There is another example of a pathologist who receives a full time salary for supervising a laboratory in one town while at the same time managing his own private laboratory in a neighbouring community. It is common among pathologists, in the base hospitals in particular, to have sources of income in addition to their full-time hospital-derived salary. It was suggested to the Committee that the ability of pathologists to maintain a side interest in a private laboratory is a necessary part of the compensation package required to attract and retain qualified pathologists. We believe, however, that the interests of the public will be best served if pathologists received instead a compensation package that is competitive with the remuneration of pathologists in other provinces and does not place pathologists in a position of conflict of interest.

If this cannot be achieved, we believe that pathologists employed by the public sector should fully disclose any financial relationship that places them in a conflict of interest. Certainly employers must ensure that compensation afforded to pathologists is earned by service to the organization.

Recommendation 12:

A PROVINCIAL REVIEW OF THE REMUNERATION AND CONDITIONS OF SERVICE OF PATHOLOGISTS TO BE UNDERTAKEN WITH THE ELIMINATION OF CONFLICT OF INTEREST AND DOUBLE PAYMENT AMONG ITS OBJECTIVES.

The Provincial Laboratory exists within the Department of Health and has been in operation since 1905. It provides the function of a public health laboratory and in this role it is part of a comprehensive national and provincial network which provides an integrated patient diagnostic and outbreak investigation service in Canada. As a part of the Laboratory and Diseases Control Services Branch it provides the following functional units:

a) Environmental Sciences Laboratory;
b) Communicable Diseases Control Registry in Regina;
c) Sexually Transmitted Diseases(STD) Clinics in Regina and Prince Albert;
d) Tuberculosis Control Registry in Saskatoon;
e) Clinics in Regina, Saskatoon and Prince Albert (mobile clinics in Northern Saskatchewan);
f) Research Support Unit (formerly known as the Pharmacoepidemiology Unit);
g) Support Services;
h) Surveillance of nationally notifiable diseases;
i) Outbreak investigation services;
j) Sexually transmitted disease monitoring;
k) Vaccine preventable diseases monitoring;
l) HIV/AIDS monitoring;

m) Provision of a structure consistent with that of the Laboratory Centre for Disease Control (LCDC), Health and Welfare Canada.

All the above functions are those normally associated with a public health laboratory. In addition, the Provincial Laboratory provides a major service to rural hospitals in the fields of microbiology and clinical chemistry. The laboratory also provides specialized testing in the fields of immunoserology, including screening for rubella antibody and syphilis. In the field of clinical chemistry, the laboratory provides many specialized services to other laboratories in the province.

It is in the fields of commonly performed tests in microbiology and clinical chemistry that the laboratory has expanded over the years. It has responded to demands placed upon it, mainly from rural hospitals, to provide this service and it has provided a needed service. In doing so, however, the laboratory has fallen into the trap of duplicating equipment and staff already provided to excess in Regina. The annual budget of $7.5M is far beyond that amount needed to fund the laboratory's public health function. The laboratory claims it is providing commonly performed tests in a cost effective manner. This may well be true if the laboratory is seen in isolation. The laboratory is not in isolation but is in a city which has overcapacity in terms of clinical laboratories. It is accepting specimens from great distances, specimens which often pass by laboratories with excess capacity. On the other hand, some functions normally associated with a provincial laboratory are being duplicated in hospital laboratories elsewhere, with an example being the establishment of a tuberculosis laboratory in Saskatoon.

There is no question that the Provincial Laboratory is well managed and boasts great expertise among its staff. There is also no question that it would best serve the province by concentrating on its public health function, on its role in the provision of an environmental service, and on its role in the provision of low volume, high cost testing of a specialized type, (i.e. as a provincial resource). The divestiture of the commonly performed tests to district laboratories would allow such laboratories to build up volumes sufficient to become viable and would allow for the reinforcement of local expertise in testing in the districts.

The Lone-Warren Report recommended that the Provincial Laboratory discontinue what it termed to be routine testing in order to concentrate on its roles as a provincial reference laboratory and a public health laboratory. The Provincial Laboratory currently does testing which is referred to them from rural hospitals and community clinics. This testing could be performed in the regional and base hospitals without the need for the transporting of specimens over distances as great as those found necessary at the present time. Current peculiarities in management and funding arrangements appear to encourage this function of the Provincial Laboratory. Although some of the reasons for their recommendation are no longer applicable, we are in agreement with the recommendation in the Lone-Warren report with regard to the Provincial Laboratory.

Recommendation 13:

THE PROVINCIAL LABORATORY TO CONFINE ITS ROLE TO THAT OF A PUBLIC HEALTH LABORATORY AND DISCONTINUE ROUTINE DIAGNOSTIC TESTING.

The ideal level of concentration of specific tests depends on a number of factors - the importance of having locally available testing facilities, economies of scale in performing tests, the implications on cost and quality of transporting specimens, the ability to conduct education programs, the ability to attract specialized pathologists, the array of clinical services offered at various hospitals, and so forth. The decision on how to organize testing facilities should be left to individuals with appropriate expertise. However, the Committee believes that certain laboratory services lend themselves to centralization, and this has been referred to in relation to the functions of the Provincial Laboratory. Blood banking would lend itself to centralization in one major centre in the province, with cross-matching services available in the district laboratories. The Red Cross laboratories would provide such a centralized service. Consideration should be given to consolidating blood banking services into one of the Red Cross Laboratories.

Bone banking is another service which is in danger of fragmenting in the province and which would benefit from centralization into one laboratory.

Cytology testing is a commonly used diagnostic aid. This service requires particular expertise and volume to maintain quality. Base and regional hospitals need to maintain access to diagnostic cytology services to support such invasive investigations as fine needle aspirations and the various types of endoscopy procedures. Even so District Health Boards need to ensure these highly specialized services are concentrated in as few laboratories as is compatible with adequate service. Screening cytology is an area where there is no great need for rapid turnaround time, but there is a need for expertise and large volumes to maintain that expertise. There is a need to keep a patient registry for patient follow-up, call-back and for epidemiological reasons. This service is fragmenting with at least one private laboratory providing part of the service. It is essential that screening cytology be confined to no more than two laboratories in the province.

Recommendation 14:

> **SCREENING CYTOLOGY SERVICES FOR THE PROVINCE TO BE CENTRALIZED IN TWO LABORATORIES, ONE IN SASKATOON AND ONE IN REGINA. THE COST OF THIS SERVICE WOULD BE ALLOWED FOR IN THE BUDGETARY ALLOCATION OF THE TWO DISTRICT HEALTH BOARDS.**

Rural hospital laboratories, of which there are 111 in the province, are serviced by Registered Laboratory Technologists and/or Certified Combined Laboratory and X-ray Technicians. These laboratories are required to engage a pathologist under the Medical Laboratory Licensing Act to:

"a) Provide education to employees in the medical laboratory;
b) Assist the medical laboratory in maintaining an adequate level of performance; and
c) Whenever the results of the proficiency testing program in Section 27(of

> the Act) indicate that the medical laboratory is not performing adequately, assist the medical laboratory to become proficient."

It is very clear that this pathologist service is spotty at best. The Committee visited laboratories which had never been attended by a pathologist. On the other hand, some laboratories are visited quarterly. Some hospitals have an arrangement with pathologists, but they do not remunerate the pathologist for visiting. It is essential that pathologists provide this function in the province. An improved service would be a team approach where a pathologist would visit regularly, and at reasonable intervals set by the District Health Board, and would be accompanied by an experienced Registered Laboratory Technologist from a larger centre in order that both professional and technical issues could be addressed simultaneously and in a spirit of co-operation.

Recommendation 15:

> **THE SUPERVISION OF LABORATORIES IN RURAL AREAS BY PATHOLOGISTS TO BE STANDARDIZED AND FUNDED ADEQUATELY, AND PATHOLOGISTS TO BE ACCOMPANIED ON THEIR VISITS BY A REGISTERED LABORATORY TECHNOLOGIST.**

Over the past twenty years evidence has accumulated in the literature identifying great variations in practice patterns among physicians. These variations are often based on medical uncertainty in relation to patient management under different clinical circumstances. The current interest in North America and in the United Kingdom in the development and dissemination of clinical guidelines is a response to the recognition that medical uncertainty lies at the root of varying utilization patterns under similar clinical circumstances. This is particularly the case where non-emergency discretionary procedures are studied. As many as 25-30% of such discretionary procedures are often found by panels of experts to be inappropriate. Diagnostic laboratory testing can be classified in many circumstances to be discretionary. The tests carry little risk for either the patient or the physician ordering them. It is not surprising, therefore, that the literature has many descriptions of the inappropriateness of laboratory testing.

The literature discusses reasons for inappropriate testing, some of which, as viewed by two authors (Connelly and Steele, 1980), are attached as Appendix G. In a discussion on the cause of excessive testing Kassirer (1989) states, "Excessive testing has many causes beside the quest for diagnostic certainty. Some are a function of the forces imposed on the physician by our system of patient care---for example, pressure from peers and supervisors, the convenience with which tests are ordered, the demands of patient or family, and the desire to avoid malpractice claims. Others stem from physicians' personal practices and whims---among them, curiosity about test results, ignorance of the characteristics of tests, financial motives, and irrational and ossified habits. No consensus has been reached about which elements contribute most, but I believe that one neglected cause, attributable to the individual physician, is the inordinate zeal for certainty." We have found no reason to disagree with those comments.

Some techniques aimed at influencing physician utilization are:

1) Development of clinical protocols;
2) Education of physicians on the costs, risks and effectiveness of tests, and on decision analysis and probability theory (Davidoff, Goodspeed and Clive, 1989);
3) Monitoring of comparative test ordering patterns among physicians with feedback to the physicians (Williams and Eisenberg, 1986, Berwick and Coltin, 1986, Bareford and Hayling, 1990, Gama, Nightingale, Broughton, et al., 1991, Winkens, Pop, Grol, and Knottnerus, 1992);
4) Provision of information on the costs of each laboratory test (Cohen, Jones, Littenberg and Neuhauser, 1982, Tierney, Miller and McDonald, 1990);
5) Regular faculty chart review in teaching hospitals (Everett, deBlois, Chang and Holets,1983);
6) Requiring written justification for test orders (Novich, Gillis and Tauber, 1985);
7) Reduction in the numbers of tests printed on the requisition forms (Zaat, van Eijk and Bonte, 1992);
8) Financial incentives aimed at discouraging testing (Murray, Greenfield, Kaplan and Yano, 1992).

These measures all have varying degrees of success, although there is at least one article which describes physician education in this context as a failure as a cost containment strategy (Schroeder, Myers, McPhee, et al., 1984). The bulk of evidence, however, does attribute success over the influence of physician ordering practices to physician education and feedback, the establishment of test ordering protocols and providing information to physicians on the costs of tests at the time of ordering. We believe these strategies have a major part to play in the reduction of laboratory utilization. The College of Medicine and the College of Physicians and Surgeons of Saskatchewan are two bodies in the province which are well placed to develop initiatives in these areas. It is recognized that work is already underway by these organizations as well as by the Health Services Utilization Research Commission.

Recommendation 16:

THE COLLEGE OF MEDICINE, THE COLLEGE OF PHYSICIANS AND SURGEONS, THE HEALTH SERVICES UTILIZATION RESEARCH COMMISSION AND THE SASKATCHEWAN MEDICAL ASSOCIATION EMBARK UPON A CO-ORDINATED EDUCATIONAL PROGRAM FOR PHYSICIANS DESIGNED TO INFLUENCE THE ORDERING OF LABORATORY TESTS IN A MANNER CONSISTENT WITH THE DELIVERY OF AN OPTIMUM QUALITY OF CARE WITH THE OPTIMUM USE OF LABORATORY RESOURCES.

Recommendation 17:

THE COLLEGE OF MEDICINE, THE COLLEGE OF PHYSICIANS AND SURGEONS, THE HEALTH SERVICES UTILIZATION RESEARCH COMMISSION AND THE SASKATCHEWAN MEDICAL ASSOCIATION WORK TOGETHER TO DEVELOP GUIDELINES AND PROTOCOLS DESIGNED TO GUIDE PHYSICIANS IN ORDERING LABORATORY TESTS UNDER COMMON CLINICAL CIRCUMSTANCES.

The issue of financial incentives to physicians is of critical importance.

There is evidence that physicians remunerated by capitation fees or by salary order fewer diagnostic tests than physicians remunerated on the basis of fee-for-service under similar clinical circumstances. It is beyond the scope of this review to make recommendations on methods of physician remuneration in the province, but the Committee feels it would be remiss if it omitted to mention physician payment reform as a strategy to be considered in reference to the reduction of laboratory utilization.

The role of pathologists, laboratory technologists and technicians has, in large part, evolved into that of a provider of testing services and away from the role of consultant. The result has been the waste of a considerable amount of expertise which could contribute greatly to the effective management of the system, with respect to which tests should be ordered under various clinical circumstances, redundancy of tests, obsolescence of tests, and so on. Pathologists should assume a greater role in scrutinizing physician ordering patterns. This needs to be undertaken in each individual laboratory, and also at the level of the District Health Boards, each of which should establish a Diagnostic Laboratory Utilization Committee, composed of pathologists, clinicians, technologists and managers, reporting to the Chief Executive Officer.

Recommendation 18:

> **PATHOLOGISTS, AS PART OF THEIR DUTIES, TO ASSIST PHYSICIANS IN THE APPROPRIATE ORDERING OF TESTS AND TO MONITOR PHYSICIAN ORDERING PRACTICES IN THEIR LABORATORIES.**

Recommendation 19:

> **EACH DISTRICT HEALTH BOARD TO ESTABLISH A LABORATORY UTILIZATION COMMITTEE WITH A MANDATE TO MONITOR AND INFLUENCE PHYSICIAN ORDERING PATTERNS.**

As has been indicated above, the convenience of test ordering influences laboratory utilization. The type of laboratory requisition form which allows for the ticking-off of required tests without the requirement for writing makes the ordering of multiple tests very easy. In particular, where tests are grouped as a "screen" and require only one tick to initiate several tests there exists an open invitation to order unnecessary tests. In a study from The Netherlands (Zaat, van Eijk, and Bonte, 1992) the number of tests ordered by a group of general practitioners fell by 18% when the numbers of tests printed on the requisition form was reduced from 178 to 15 plus several urine and faeces tests and a space for "others."

Recommendation 20:

> **A STANDARD LABORATORY REQUISITION FORM, WITH ONLY A FEW COMMONLY ORDERED TESTS APPEARING ON THE FORM, TO BE DEVELOPED AND IMPLEMENTED.**

Recommendation 21:

> **ALL TESTS TO BE ORDERED SEPARATELY WITHOUT THE OPPORTUNITY TO ORDER BATTERIES OF TESTS.**

There is evidence in the literature that cost awareness among physicians influences ordering behaviour. A 14% reduction in outpatient testing per patient visit occurred among a group of primary care physicians after the cost per test was displayed on the computer screen used for ordering (Tierney, Miller and McDonald, 1990).

Recommendation 22:

> **THE AVERAGE COST OF EACH LABORATORY TEST TO BE PRINTED AGAINST EACH TEST ON THE REQUISITION FORM.**

8. IMPLEMENTATION

The recommendations that have been made in this report represent a mix of those which may be implemented immediately and others which will take longer to put in place. In this section, we present a process which could be used to implement the recommendations of this report.

The Department of Health should immediately establish a branch (Diagnostic Laboratory Services Branch) which will be responsible for the implementation of the recommendations of this report.

This Branch should immediately begin to work with the three existing District Health Boards to develop a plan to rationalize inpatient and outpatient laboratory testing within their areas of jurisdiction with a view to changing to a per capita based budget effective April 1, 1993. This will include rationalization of the public sector (hospitals and community clinics), preparation for funding outpatient testing on a contract basis and paying for specialized testing that the District Boards decide should be performed outside the district. This reorganization will also incorporate the centralization of screening cytology services (Recommendation 14).

Since almost all of the private Category 3 laboratory work is carried out within the geographic jurisdiction of the existing Health Boards, the complete elimination of fee-for-service laboratory services (Recommendations 9 and 10) can be accomplished through delisting Category 1 and 2 physician office laboratories and remaining Category 3 laboratories (Lloydminster, Moose Jaw and Yorkton) for fiscal year 1993/94. There should be budgetary provision for the rural, community, and regional hospitals for the increased workload which will result from this change.

The Branch should also immediately establish a Provincial Advisory Committee on Diagnostic Laboratory Services (Recommendation 8) and work with the Boards to establish district Laboratory Utilization Committees (Recommendation 19). The Branch and Health Boards should consider carefully the composition of these committees, ensuring that representation is sufficient to allow input from all groups with relevant expertise. The primary tasks of the Provincial Advisory Committee will be to develop standards which must be met by laboratories in terms of quality, convenience to users, and laboratory supervision (Recommendations 4, 8 and 15). The Committee should also develop the minimum menu of tests that should be available at various hospitals.

The development of a standard laboratory requisition form consistent with

Recommendations 20, 21 and 22 can be immediately implemented by either the Diagnostic Laboratory Services Branch or existing branches within the Department of Health.

The implementation of longer term recommendations should not be delayed. The Branch should as soon as possible enter into discussions with the College of Medicine, the College of Physicians and Surgeons, the Health Services Utilization Research Commission, and the Saskatchewan Medical Association with a view to creating appropriate educational initiatives, such as changes in curriculum, development of test ordering protocols, and so forth (Recommendations 16 and 17).

The development of an integrated informational base should also proceed as quickly as possible. While the standardized reporting of cost and workload information (Recommendation 6) will undoubtedly take some time, an immediate improvement in the data base may be achieved by requiring all providers of laboratory services to forward data on actual tests performed, actual tests referred out to the Provincial Laboratory and other referral centres, as well as the physicians who order the tests. While it may be impossible to develop immediately an integrated computer system which will allow users and providers of laboratory services on-line access to data (Recommendation 7), the existence of the Taltac computer system currently used for the prescription drug plan suggests that such a system can be developed in the not too distant future.

The remaining work of the Diagnostic Laboratory Services Branch will be to extend the rationalization of laboratory services into other areas of the province where District Health Boards have yet to be created (Recommendation 5), to initiate a review of how pathologists are compensated (Recommendation 12), and as the other recommendations are implemented, to reduce the role of the Provincial Laboratory to that of a Public Health Laboratory (Recommendation 13). As the creation of District Health Boards goes forward throughout the province, the Branch will devolve its responsibilities to those Boards.

While it is true that the implementation plan presented above assigns a great deal of responsibility to the Diagnostic Laboratory Services Branch, the Review Committee heard from the various stakeholders pledges of cooperation and expressions of support for any initiatives that will lead to the development of a more efficient laboratory service. It is hoped that the Branch will experience cooperation throughout the system which will facilitate its efforts to implement the recommendations of this report.

9. CONCLUSION

This review has revealed areas within the current diagnostic laboratory service in the province where significant cost savings can be achieved without any deterioration in the quality of service. In order to achieve savings there is a need for a total reorganization of the management of diagnostic laboratory service delivery. Changes will result in the disappearance of some laboratories, the reduction in size of some laboratories and the enhancement of service provided by others. The recommended changes, if acted upon, will undoubtedly result in altered employment opportunities within the laboratory services.

There will be a need for all stakeholders to view the opportunities lying within this review as a challenge. The challenge will be to undertake a reform of one important sector of the health care with the objective of demonstrating the potential for significant cost reduction. The implementation of the recommendations contained in this review will require vision and courage on the part of those given the task. It will require the acceptance of the view that the objective of the health care system is to provide high quality, cost-effective health care services to the people of Saskatchewan and not a job creation program, nor rural economic development programs.

Respectfully submitted,

Miles F. Kilshaw

Elmer I. Schwartz

Gary N. Tompkins

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APPENDIX A

Individuals interviewed by the Laboratory Review Committee

Ahuja, Praveen	Regional Services Director
Alport, Dr. E. A.	Pasqua Hospital
Ames, Charles	Former Laboratory Consultant
Borody, John	Saskatchewan Health
Bahr, Fred	Prince Albert Victoria Union Hospital
Blum, Edna	Saskatchewan Society of Medical Laboratory Technologists
Bertsch, Bonnie	Health Sciences Association
Brandt, Ken	Provincial Laboratory
Block, Dr. H.	Medical Arts Laboratory (MDS), Saskatoon
Bridge, Dr.	Regina Medical Laboratories
Beek, Neil	Regional Services Director
Bodenstab, Dr. E.	Tisdale Union Hospital
Boechler, Pat	Prince Albert Community Clinic
Boutin, Bonnie	Saskatchewan Health
Card, Dr. B.	Royal University Hospital, Saskatoon
Chary, Dr.	St. Paul's Hospital, Saskatoon
Cunningham, Dr. T.	Royal University Hospital, Saskatoon
Cheke, Dorothy	Health Sciences Association
Chan, Ed	Provincial Laboratory
Congly, Lee	Provincial Laboratory
Clarke, Dr.	Regina Medical Laboratories
Crawford, Dr.	Victoria Union Hospital, Prince Albert
Cunningham, Dr.T.	Royal University Hospital, Saskatoon
Dempsey, Gerry	Swift Current Union Hospital
Denton, Gordon	Tisdale Union Hospital
De Santo, Vera	Service Employees International Union
Devaraj, Dr.	Regina General Hospital
Dobson, Betty	Provincial Laboratory
Dorsett, Dr. W. A.	Saskatchewan Health
Duffy, Dr. P.	Plains Health Centre

Dunville, Debbie	Saskatchewan Association of Combined Laboratory and X-ray Technicians
Eichhorst, Jeff	Provincial Laboratory
Emery, Allen	Provincial Laboratory
Ewen, Janice	Saskatchewan Association of Combined Laboratory and X-ray Technicians
Fan, David	Victoria Union Hospital, Prince Albert
Favreau, Edna	Watson Union Hospital
Fox, Harvey	Regina Health Board
Fritz, Loretta	Saskatchewan Health Care Association
Fryett, Maureen	Service Employees International Union
Fuller, Dr.	Melfort Union Hospital
Funk, Harvey	Plains Health Centre; Pasqua Hospital
Gaudet, Charles	Regional Services Director
Genest, Sharon	Service Employees International Union
George, Dr. D.	Royal University Hospital
Giesbrecht, Karen	Health Sciences Association
Gill, Royce	Regina Health Board
Gould, Beatrice	Provincial Laboratory
Gunderson, Wendy	Kyle Hospital
Gwin, Verlin	Saskatchewan Health
Hart, Frank	Deputy Minister, Economic Development
Hassard, Dorian	Saskatchewan Government Employees' Union
Hastie, Holly	Saskatchewan Government Employees' Union
Hayes, Dr.	Plains Health Centre
Hayes, Joan	Prince Albert Medical Laboratories
Helmsing, Hewitt	Saskatchewan Health-Care Association
Hill, Joanne	Regina General Hospital
Hobday, Ed	Saskatchewan Medical Association
Hollar, Bernadette	Elrose Hospital
Holmes, Jim	Canadian Union of Public Employees
Hook, Flo	Pasqua Hospital
Horsman, Greg	Provincial Laboratory
Hunter, Forbes	MDS
Irwin, Dr. W. C.	Saskatchewan Society of Clinical Chemists
Jacobs, Wilma	MDS
Johnson, Dan	Melfort Union Hospital

Johnson, Dr. D.	Swift Current Union Hospital
Johnson, Dr. G.	Royal University Hospital
Kalra, Dr. J.	Royal University Hospital
Kendel, Dr. D.	Registrar, College of Physicians and Surgeons of Saskatchewan
Kolke, Dr. R.	Melfort Union Hospital
Krahn, Lawrence	Saskatchewan Health
Kroll, Duncan	Saskatchewan Government Employees' Union
Kwasniak, Janet	Provincial Laboratory
Lake, Jim	Regional Services Director
Laliberte, Elaine	Service Employees International Union
Laxdal, Dr. V. A.	Saskatchewan Society of Clinical Chemists
Layng, Karen	Saskatchewan Health
LeGoffe, Bob	Rosetown Union Hospital
LePage, Raymond	Saskatchewan Society of Medical Laboratory Technologists
Lindsay, David	Canadian Union of Public Employees
Link, Helene	Service Employees International Union
MacDonald, Georgina	Saskatchewan Health
MacFarlene, L.	Saskatoon Health Board
MacKenzie, Jean	Swift Current Union Hospital
MacMillan, Dr. S.	Chair, Health Services Utilization Research Commission
Madole, Laurel	Saskatchewan Society of Medical Laboratory Technologists
Makahonuk, Glen	Canadian Union of Public Employees
Makeechak, Ted	Health Sciences Association
Mambo, Dr. C.	Prince Albert Medical Laboratories
Mangal, Dr. A.	Metro-McNair
Marchand, Pat	Regina Medical Laboratories
Marsh, Virginia	Swift Current Union Hospital
Marwick, Tom	Regina Community Clinic
Massey, Dr. Lorne	Royal University Hospital
Mazzel, Evelyn	Kyle Hospital
McCallion, Bernie	Pasqua Hospital
McFarlane, Lawrie	Saskatoon Health Board
McSheffrey, Dr. B.	Saskatoon Red Cross

Melia, Patrick	Saskatchewan Health
Montain, Marie	Melfort Union Hospital
Murphy, Dr. Kevin	Regina Medical Laboratories
Murray, Dr. Bruce	Saskatoon City Hospital
Murtagh, James	St. Paul's Hospital
Neufeldt, Shelley	Saskatoon Community Clinic
Neumeier, Brenda	Saskatchewan Association of Combined Laboratory and X-ray Technicians
Nilson, Linda	Regina Health Board
Nish, Margaret	Regina Health Board
Olesko, Renate	Health Sciences Association
Ostapovich, E.	Regional Services Director
Padmanabh, Dr. S.	St. Paul's Hospital
Page, Pat	Elrose Hospital
Podiluk, W.	St. Paul's Hospital
Popkin, Dr. D	College of Medicine, University of Sask
Pretzlaw, G.	Plains Health Centre
Purcell, Linda	Rosetown Union Hospital
Qualtiere, Dr. L.	Royal University Hospital
Rhodda, Richard	Saskatoon Health Board
Rice, Stan	Prince Albert Region Health Board
Richards, Dr. G.	Saskatchewan Association of Pathologists
Riordon, J.	Tisdale Union Hospital
Rix, Dr. D.	Metro-McNair Laboratories
Rodda, R.	Saskatoon Health Board
Rogstad, Dr. V. J.	Watson Union Hospital
Rose, Sharon	Kyle Hospital
Rosenau, George	Saskatchewan Government Employees' Union
Rousseau, Pauline	Provincial Laboratory
Schaan, Bernard	Health Sciences Association
Scharfstein, Dr. S. B.	Saskatchewan Medical Association
Schoonover, A.	Health Sciences Association
Shaughnessy, Dr. B.	Victoria Union Hospital
Shewchuk, Dr. J.	Tisdale Union Hospital
Shukoor, Dr. S.	Swift Current Union Hospital
Sidaway, Fred	Provincial Laboratory

Slattery, Tim	Health Sciences Association
Stephenson, Dr. D.	Saskatchewan Association of Pathologists
Strand, Linda	Provincial Laboratory
Sutherland, Ian	Royal University Hospital
Swan, Bonnie	Saskatchewan Health
Thomas, Dr. E.	Regina General Hospital
Tokaryk, Don	Saskatchewan Association of Combined Laboratory and X-ray Technicians
Torrie, Alan	MDS
Treble, Ron	Provincial Laboratory
Tweed, Louise	Royal University Hospital
Van Der Westhuizen, Dr.	Regina General Hospital
Veller, Wilfred	Melfort Union Hospital
Vetters, Dr. J.	Regina General Hospital
Ward, Grant	Saskatoon Community Clinic
Warren, David	Saskatchewan Health
Warren, Lynne	Saskatchewan Association of Combined Laboratory and X-ray Technicians
Wasko-Lacey, Linda	Rosetown Union Hospital
Whitby, Paula	Service Employees International Union
Wittal, Esther	Provincial Laboratory
Yamada, Ronald	MDS
Yatsura, Alarice	Health Sciences Association
Zbitnew, Audrey	Royal University Hospital
Zimmerman, Shirley	Provincial Laboratory

Organizations interviewed by the Laboratory Review Committee

CANADIAN RED CROSS:

Dr. Brian McSheffrey, Executive Director

CANADIAN UNION OF PUBLIC EMPLOYEES:

Jim Holmes
David Lindsay
Glen Makahonuk

COLLEGE OF MEDICINE, UNIVERSITY OF SASKATCHEWAN:

Dr. David Popkin, Acting Dean

COLLEGE OF PHYSICIANS AND SURGEONS OF SASKATCHEWAN:

Dr. Dennis Kendel, Registrar

HEALTH SCIENCES ASSOCIATION:

Bonnie Bertsch
Edna Blum
Dorothy Cheke
Karen Giesbrecht
Ted Makeechak
Renate Olesko
Bernard Schaan
Aleatha Schoonover
Tim Slattery
Alarice Yatsura

MDS:

Alan Torrie, President
Forbes Hunter, Saskatchewan Vice-President
Dr. Henry Block, Director, Medical Arts Laboratory, Saskatoon
Dr. E. A. Alport, Laboratory Manager, MDS - Regina
Wilma Jacobs, Director

METRO-McNAIR - PROFESSIONAL MEDICAL LABORATORIES:

Dr. E. A. Alport
Dr. Anil Mangal
Dr. Rix

REGINA HEALTH BOARD:

Royce Gill, Acting Chief Operating Officer
Harvey Fox, Executive Director, South Saskatchewan Hospital Centre
Dr. Linda Nilson, Vice-President, Medicine, Regina General Hospital
Margaret Nish, Ph.D, Acting Chief Executive Officer, Regina General Hospital

SASKATCHEWAN ASSOCIATION OF COMBINED LABORATORY AND X-RAY TECHNICIANS:

Debbie Dunville
Janice Ewen
Brenda Neumeier
Don Tokaryk
Lynne Warren

SASKATCHEWAN GOVERNMENT EMPLOYEES' UNION:

Charles Ames
Lee Congly
Betty Dobson
Jeff Eichhorst
Beatrice Gould
Dorian Hassard
Holly Hastie
Duncan Kroll
George Rosenau
Fred Sidaway
Esther Wittal
Shirley Zimmerman

SASKATCHEWAN HEALTH:

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Urban Hospitals Branch:

Bonnie Boutin, Operational Review Analyst
Georgina MacDonald, Assistant Director, Operational Review

Medical Care Insurance Branch:

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SASKATCHEWAN HEALTH-CARE ASSOCIATION:

Hewitt Helmsing, President & Chief Executive Officer
Loretta Fritz, Director, Communications & Member Services

SASKATCHEWAN MEDICAL ASSOCIATION:

Dr. Brian Scharfstein, Executive Director
E. Hobday, Director of Administration

SASKATCHEWAN SOCIETY OF CLINICAL CHEMISTS

Dr. W. C. Irwin, Vice-President
Dr. V. A. Laxdal

SASKATCHEWAN SOCIETY OF MEDICAL LABORATORY TECHNOLOGISTS:

Fred Bahr
Edna Blum
Gerry Dempsey
Raymond LePage
Laurel Madole

SASKATOON HEALTH BOARD

L. MacFarlane, President
R. Rodda, Vice-President

SERVICE EMPLOYEES INTERNATIONAL UNION:

Vera De Santo
Maureen Fryett
Sharon Genest
Elaine Laliberte
Helene Link
Paula Whitby

APPENDIX C

Laboratories Toured by the Laboratory Review Committee

Canadian Red Cross Society, Saskatoon
    Dr. B. McSheffrey, Director

Elrose Hospital
    Bernadette Hollar, Administrator
    Pat Page, CCT

Holy Family Hospital (Prince Albert)
    Stan Rice, Director-P.A. Region Health Board
    Fred Bahr, Head of Laboratory Services

Kyle Hospital
    Evelyn Mazzel, Administrator
    Wendy Gunderson, CEO/DON
    Sharon Rose, Laboratory Technician

MDS Laboratory (Toronto)
    Ronald H. Yamada, Senior Vice-President, New Technologies and Corporate Affairs
    Dr. J. C. Nixon, Medical Director
    J. Edward Boyce, Senior Vice-President, Organization Dynamics

Medical Arts Laboratory (MDS) (Saskatoon)
    Dr. H. Block, Laboratory Director
    Raymond LePage, Director
    Forbes Hunter, Vice President, MDS Saskatchewan

Melfort Union Hospital
    Wilfred Veller, Administrator
    Dr. R. Kolke, Chief of Staff
    Dr. C. Mambo, Consulting Pathologist
    Dan Johnson, Technical Director
    Dr. Fuller
    Marie Montain, Administrative resident

Pasqua Hospital (Regina)
    Dr. E. A. Alport, Laboratory Director
    Flo Hook, Laboratory Manager
    Bernie McCallion, Administrator

Plains Health Centre (Regina)
    Dr. Hayes, Laboratory Director
    Gerard Pretzlaw, Laboratory Manager

Prince Albert Medical Laboratories, Inc.
    Dr. C. Mambo, Pathologist and Director
    Joan Hayes, Chief Technologist

Provincial Laboratory (Regina)
- Dr. L. Strand, Executive Director, Laboratory Control Branch
- J. Kwasniak, Computer Manager
- P. Rousseau, Director of Support Services
- A. Emery, Director of Clinical Chemistry
- K. Brandt, Head, Virus Laboratory
- G. Horsman, TB Program and STD Clinics
- E. Chan, Chief, Microbiology
- R. Treble, Head, Special Chemistry
- J. Eichhorst, Toxicology Technologist

Regina Community Clinic
- Tom Marwick, Executive Director

Regina General Hospital
- Dr. J. Vetters, Laboratory Director
- Joanne Hill, Laboratory Manager
- Dr. N. VanDerWesthuizen, Pathologist
- Dr. E. Thomas, Microbiologist

Regina Medical Laboratories
- Dr. J. Vetters, Resident Pathologist
- Dr. K. Murphy
- Dr. Clarke
- Dr. Bridge
- Pat Marchand, Laboratory Manager

Rosetown Union Hospital
- Bob LeGoffe, Administrator
- Linda Wasko-Lacey, Director of Care
- Linda Purcell, Laboratory Manager

Royal University Hospital (Saskatoon)
- Dr. J. Kalra, Head of Pathology
- Ian Sutherland, Acting VP, Medical
- Audrey Zbitnew, Section Head, Virology
- Louise Tweed, Director of Administration
- Dr. L Qualtiere, Clinical Microbiology
- Dr. Lorne Massey, Clinical Chemistry
- Dr. T. Cunningham, Hematopathology
- Dr. D. George, Histopathology
- Dr. B. Card,Hematology
- Dr. G. Johnson, Orthopedics

St. Paul's Hospital (Saskatoon)
- Dr. S. Padmanabh, Laboratory Director

Saskatoon City Hospital
- Dr. B. Murray, Director of Laboratories
- Bertha Carnegie, Administrative Technologist

Saskatoon Community Clinic
- Grant Ward, Administrator
- Shelley Neufeldt, Laboratory Manager

Swift Current Union Hospital
Jean MacKenzie, Administrator
Gerry Dempsey, Laboratory Manager
Virginia Marsh, Senior Technologist
Dr. David Johnson, Chief of Staff
Dr. S. Shukoor, Pathologist

Tisdale Union Hospital
Gordon Denton, Administrator
Dr. E. Bodenstab, Chief of Staff
John Riordon, Laboratory Director
Dr. J. Shewchuk

Victoria Union Hospital (Prince Albert)
Stan Rice, Director-P.A. Region Health Board
Fred Bahr, Head of Laboratory Services
Dr. B. Shaughnessy
David Fan, Administrator
Dr. Crawford, Chief of Staff, Victoria Union Hospital
Pat Boechler, P.A Community Clinic Laboratory Supervisor

Watson Union Hospital
Edna Favreau, Administrator
Dr. V. J. Rogstad

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APPENDIX E

Revised September 22, 1992

LABORATORY REVIEW
UTILIZATION BY PRINCE ALBERT AND SWIFT CURRENT RESIDENTS

INTRODUCTION

The terms of reference for the Laboratory Review Commission are to review current laboratory services and recommend the most efficient, cost-effective method of delivering and funding quality laboratory services in Saskatchewan. One item to be examined in this process is the effect of establishing bleeding stations on the utilization of lab services. Measuring this is not easily done. Most areas either have a pathologist (with or without a bleeding station) or have neither a pathologist nor a bleeding station. It was decided that two regions would be examined; one with a pathologist and a bleeding station and the other with neither. Several years of data were extracted and changes in utilization measured. The results of the study are more of a reflection of having access to a private lab rather than the effect of having a bleeding station.

METHODOLOGY

The use of lab services was examined for the Prince Albert region based on the billings by the local pathologist in 1991/92. A list of patients was recorded along with their place of residence. The drawing area for the Prince Albert region was established for those rural municipalities and Indian reserves where more than 10 percent of the local population had tests performed by the Prince Albert pathologist.

The Swift Current region was simply based on the former Swift Current Health Region. This was used as it would be a likely drawing area for the Swift Current hospital and physicians.

Once the drawing areas were established, data was extracted for 10 fiscal years, 1982/83 to 1991/92. The study population was based on the beneficiaries residing in the selected reservations and rural municipalities in January of each year. All their services at private labs were extracted for analysis.

It should be noted that most of the analysis uses data from private labs. There is a lack of data for hospitals and the Provincial Laboratory. A complete analysis is not possible due to the lack of data. This will discussed in detail later on.

CHANGE IN PHYSICIAN EXPENDITURES

The growth in expenditures for laboratory services (and health care services in general) have risen dramatically. Total provincial expenditures for lab services were $8.8M in 1982/83, more than doubling to over $20M in 1991/92. For the two regions under study, expenditures during this period increased a relatively low 38 percent in Swift Current and relatively high 266 percent in Prince Albert. Table I shows payments for lab services in 1982/83 lab services $413,296 for Prince Albert residents and $273,878 for residents of Swift Current. Payments increased to $1,512,747 and $377,212 respectively by 1991/92.

TABLE I: PRINCE ALBERT AND SWIFT CURRENT REGIONS - POPULATION, PAYMENTS, AND PAYMENTS PER 100 POPULATION

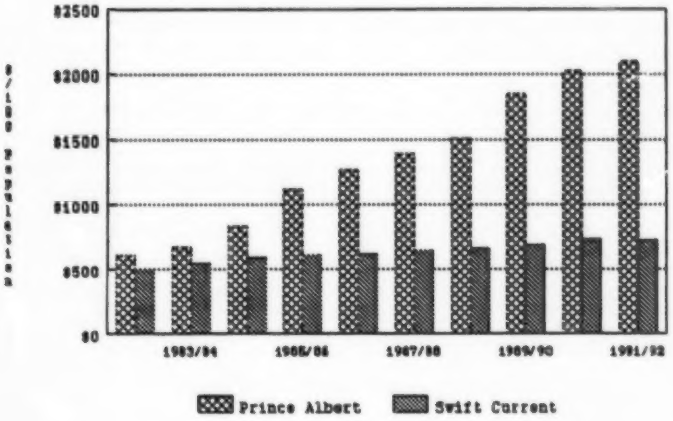
	Prince Albert			Swift Current		
Year	Pop	Payments	Payments/ 100 Pop	Pop	Payments	Payments/ 100 Pop
1982/83	67,530	$413,296	$612.02	54,978	$273,878	$498.16
1983/84	70,638	$476,929	$675.17	57,046	$312,747	$548.24
1984/85	71,482	$597,679	$836.13	57,585	$339,839	$590.15
1985/86	72,028	$803,999	$1,116.23	57,167	$348,364	$609.38
1986/87	72,638	$923,281	$1,271.07	56,606	$352,215	$622.22
1987/88	71,974	$1,003,161	$1,393.78	55,686	$357,485	$641.97
1988/89	73,165	$1,102,350	$1,506.66	55,352	$366,131	$661.46
1989/90	73,226	$1,356,064	$1,851.89	54,208	$373,542	$689.09
1990/91	71,784	$1,455,398	$2,027.47	52,937	$388,426	$733.75
1991/92	72,050	$1,512,747	$2,099.58	52,309	$377,212	$721.12
% Change	6.7%	266.0%	243.1%	-4.9%	37.7%	44.8%
Annual Average	0.7%	15.5%	14.7%	-0.6%	3.6%	4.2%

The table shows the 1982/83 average cost per 100 population was $612 and $498; Prince Albert residents were about 25 percent higher than Swift Current residents. By 1991/92, the respective average cost per 100 population rose to $2,099 and $721; Prince Albert was nearly 200 percent higher than Swift Current. The average annual per capita increase was 14.7 percent (243 percent in total) for Prince Albert versus and 4.2 percent for Swift Current (45 percent in total).

Figure I illustrates the average lab cost per 100 population using 1982/83 as the base year.

FIGURE I:

PRINCE ALBERT & SWIFT CURRENT PAYMENTS
PER 100 POPULATION



CHANGE IN PHYSICIAN UTILIZATION

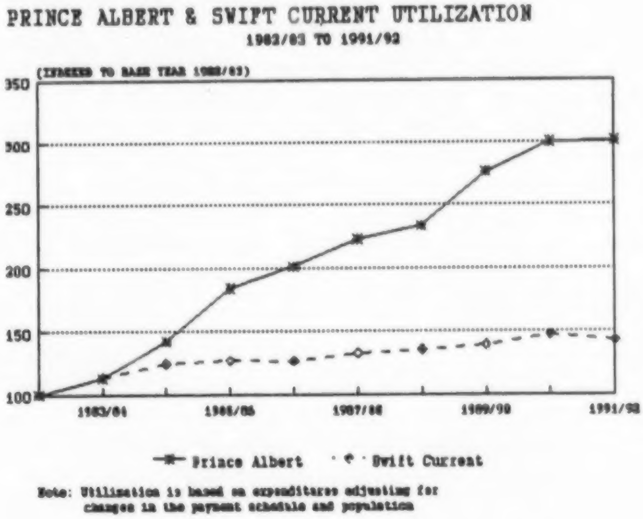
It might be suggested to use the level of services to measure utilization. This will not be used to measure utilization as one test may not be equal to one of another test (due to differences in time and effort for example). The weight used to equate tests is the cost of the service. Expenditures can be used to measure growth, however results can be deceiving when interpreting changes in utilization. Other factors can influence expenditures that are not attributable to utilization of services. Two such factors are changes in population and in the payment schedule. Increases in either will increase expenditures but not necessarily utilization.

The trend for the sparsely populated region of Swift Current was a decline in the population. The data in Table I shows the population at 54,980 in 1982/83, peaking two years later at 57,580 and declining each year thereafter to 52,310 by 1991/92. The average annual change was a slight decline of 0.6 percent.

The trend for the Prince Albert region was similar to the provincial population trends. Their population increased from 67,530 in the first year of study to 73,220 by 1989/90 and fell in the next two years to 72,050. The average annual increase was 0.7 percent.

We tend to think of changes in fees to be increasing, however, the annualized fee/benefit rate for pathologists actually declined by almost 10 percent during 1983/84 and 1984/85. After this there were increases in each year, except for 1987/88 when there was no change to fees. It took until 1989/90 to 'catch up' to the decreases experienced in the two earlier years. The average annual increase in fees for the study period was 0.7 percent.

FIGURE II:



PRINCE ALBERT & SWIFT CURRENT UTILIZATION
1982/83 TO 1991/92

Note: Utilization is based on expenditures adjusting for changes in the payment schedule and population

The expenditure data indicates that utilization (expenditures with population and fee adjustments) by Prince Albert residents will be significantly greater than Swift Current's. Figure II shows the increase in utilization for both regions. Using 1982/93 as the base year for comparison, Prince Albert's utilization of lab services rose by a total of 200 percent compared to Swift Current's much smaller increase of 42 percent.

Prince Albert resident's volume of lab services was 23 percent higher than Swift Current's in 1982/83. With the different growth in utilization, this was magnified to 160 percent greater in 1991/92.

Two other points should be raised as a partial explanation for the differences in utilization. The first is that the Prince Albert private lab does specialized testing in cytology. The access to the lab would contribute to some extra volume.

The second point is that there are more specialists in the Prince Albert region. It has been shown in other studies that access to services generally results in more use of services. Access to specialists would likely result in a higher volume of lab services. This could explain the fact that Prince Albert's utilization of lab services was 25 percent higher than Swift

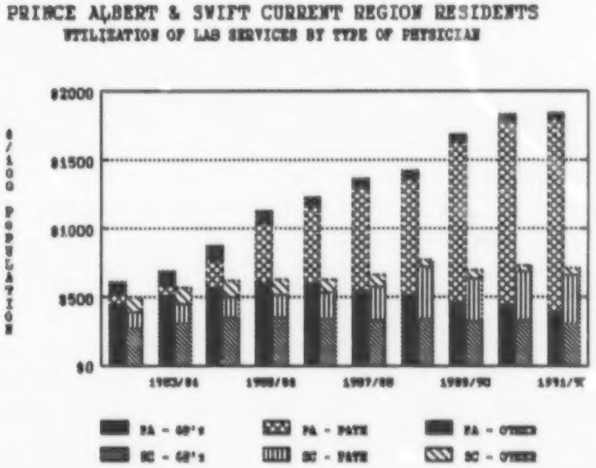
Current's in 1982/83. At the time neither region had a private lab.

TYPE OF PHYSICIANS

While the magnitude of change was unknown, the trends were expected from the outset. The study regions were selected to compare and contrast differences. There were no pathologists in either region for the first two years of the study and 1983/84 utilization rose by 13 percent in both regions. However, after a pathologist set up practice in Prince Albert in 1984/85, utilization in the two regions became significantly different. The question that can not directly be answered is what effect does the establishment of a bleeding station have. It is access to a pathologist that will have, by far, the greatest impact.

Figure III is similar to Figure I with two important distinctions. The first is Figure III is utilization and not expenditures and the second is that utilization is broken down by the type of physician performing the lab test.

FIGURE III:



PRINCE ALBERT & SWIFT CURRENT REGION RESIDENTS
UTILIZATION OF LAB SERVICES BY TYPE OF PHYSICIAN

Note: Utilization is based on expenditures adjusting for changes in the payment schedule and population

The utilization increase for Prince Albert residents was captured by private labs. The same is true for Swift Current, but at much lower rates. Table II shows the percent share of payments for three categories of physicians. As expected pathologists performed an increasingly greater portion of lab tests starting in 1984/85 for residents of the Prince Albert region.

TABLE II: SHARE OF PAYMENTS BY TYPE OF PHYSICIAN 1982/83 TO 1991/92

	PATHOLOGISTS		GP'S		OTHER	
Year	P A	S C	P A	S C	P A	S C
1982/83	10.4%	24.1%	73.6%	54.6%	16.0%	21.3%
1983/84	10.2	25.6	73.1	54.3	16.7	20.1
1984/85	23.1	25.1	64.3	56.1	12.6	18.8
1985/86	39.1	26.4	53.1	55.0	7.8	18.6
1986/87	45.5	30.2	48.5	54.3	6.0	15.5
1987/88	54.7	36.9	40.4	50.5	4.9	12.6
1988/89	58.9	42.0	36.1	49.8	5.0	8.2
1989/90	69.4	45.3	27.2	46.9	3.4	7.8
1990/91	72.2	48.3	24.5	45.6	3.3	6.1
1991/92	76.5	49.7	21.2	43.3	2.3	7.0

LOCATION OF PATHOLOGISTS

One interesting observation from Table II is that Prince Albert residents now have over three quarters of their lab tests performed by pathologists compared to one-half of the tests for the Swift Current residents. This is interesting because there are no pathologists practising in the Swift Current region. This indicates that residents are receiving physician care outside the region.

TABLE III: 1991/92 UTILIZATION BY LOCATION OF PATHOLOGISTS

Location of Pathologist	P A Residents		S C Residents	
Out-of-province	$27.31	1.9%	$157.73	44.7%
Regina	$23.11	1.6%	$76.65	21.7%
Saskatoon	$198.69	14.1%	$115.86	32.9%
Prince Albert	$1,160.19	82.3%	$2.24	0.6%
Total Path	$1,409.80	100.0%	$352.49	100.0%

Table II can be broken down further by the location of the pathologists. Table III shows residents of both the Swift Current and Prince Albert regions had tests performed by pathologists located in Regina, Saskatoon, Prince Albert and by out-of-province physicians for 1991/92.

The majority of pathologist services for Prince Albert residents were performed by local pathologists. However, the largest percent of pathologist services for Swift Current residents were performed by out-of-province (Alberta) pathologists.

HOSPITALS AND THE PROVINCIAL LABORATORY

A real grey area (black?) in this analysis is the lack of data from hospitals and the Provincial Lab. Some data is available for hospital tests, but its interpretation is not straight forward. The data is for the number of units submitted by the hospital for budget purposes. Units vary between tests and within a test, depending on how it was performed (i.e. the same test performed on different machines/analyzers can carry different units). There may also be problems with the consistency in the recording of the units over time. No data is available for tests performed at the Provincial Lab.

The hospital data can be broken down by inpatient and outpatient lab services. A pathologist setting up practice would likely have the greatest impact on outpatient lab services.

The audited hospital units for 1991/92 are not available but actual expenditures are available The use of 1991/92 data will be limited to estimating the cost of outpatient services as presented in the next section.

With these difficulties in mind the available data for hospitals will be examined. Figure IV compares utilization of physician lab services for Prince Albert and Swift Current region residents to the outpatient units reported by their local hospitals. Units have been adjusted for changes in population and are on a per capita basis.

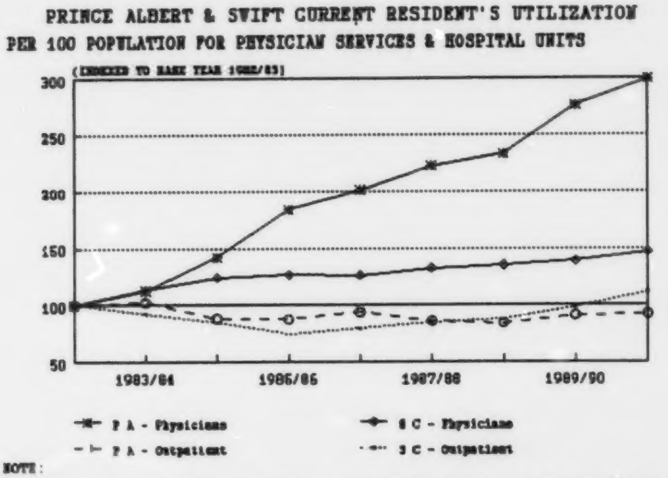
Both hospitals initially experienced a decline in per capita units reported. The declines at the Prince Albert hospital are not as dramatic as the increases in physician utilization. The decline in per capita units started in 1984/85, the same year the local pathologist set up practice. The volumes have increased since 1987/88 and the 1990/91 volumes were 7.6 percent below the 1982/83 base.

The Swift Current hospital per capita units declined each year up to 1985/86. There has been an increase each year since--1989/90 volumes were equal to the 1982/83 base and then increased by 11.5 percent in 1990/91.

Perhaps due to less access to private labs Swift Current's the 1982/83 units per capita were 54 percent above Prince Albert's. This fell to 30 percent by 1986/87 but jumped to 51 percent above

Prince Albert's the next year. There was another sharp increase in 1990/91 to 85 percent. By comparison the 1991/92 volume of physician lab services for Prince Albert residents was 160 percent higher than Swift Current's.

FIGURE IV:



PRINCE ALBERT & SWIFT CURRENT RESIDENT'S UTILIZATION PER 100 POPULATION FOR PHYSICIAN SERVICES & HOSPITAL UNITS

NOTE:
Physician utilization is based on expenditures adjusted for changes in the fee schedule and population. Hospital utilization is based on reported units with a population adjustment.

ESTIMATED COST OF LAB SERVICES

The cost of physician lab services is readily available while the hospital lab costs can be estimated. This is a crude estimate using the average cost per total units and then multiplying the outpatient units by this average. Data are not available for hospital capital expenditures or for lab tests sent to the Provincial Lab by region.

Table IV shows the actual and estimated costs for hospital lab services performed in 1990/91. The estimated outpatient costs are $337,860 for Swift Current and $222,180 for Prince Albert. The table also shows that total per unit payments to Swift Current are higher than Prince Albert's. Possible explanations for this are that Swift Current performs more intensive tests and/or Swift Current uses higher unit rated machines.

TABLE IV: TOTAL PAYMENTS, AVERAGE COST PER UNIT AND ESTIMATED OUTPATIENT PAYMENTS BASED ON AVERAGE COST, 1990/91

	Swift Current			Prince Albert		
	Total Payments	Average Per Unit	Outpat Payment	Total Payments	Average Per Unit	Outpat Payment
Salaries	$589,664	$0.3551	$198,826	$1,079,856	$0.3191	$130,874
Benefits	$58,966	$0.0355	$19,882	$107,986	$0.0319	$13,087
Supplies	$248,295	$0.1495	$83,721	$388,943	$0.1149	$47,138
Path Salary	$105,078	$0.0633	$35,431	$256,431	$0.0758	$31,078
Total	$1,002,003	$0.6034	$337,860	$1,833,216	$0.5416	$222,178
Units	1,660,596		559,928	3,384,578		410,196

The following is a crude cost estimate of the 1990/91 lab tests performed in hospitals and by physicians for residents of the Swift Current and Prince Albert regions.

TABLE V: 1990/91 ESTIMATED COST FOR LAB SERVICES HOSPITAL AND PHYSICIANS

	Hospital Estimate	Actual Phys Payments	Total (excl Prov Lab)	Cost per 100 Pop
Swift Current	$337,860	$388,430	$726,290	$1371.99
Prince Albert	$222,180	$1,455,400	$1,677,580	$2336.98

The audited hospital units for 1991/92 are not available however actual payments are. These increased by 9.5 percent in Swift Current and a slight increase of 0.4% in Prince Albert. Applying the increases equally to the hospital outpatient units provides and a 1991/92 hospital and physician estimate of $1,735,770 ($2409.12 per 100 population) for Prince Albert and $747,410 ($1428.84 per 100 population) in Swift Current.

SUMMARY AND CONCLUSION

It is difficult to measure the impact of a bleeding station. The data that is available can only partially measure the effects of a pathologist establishing a private lab.

Two regions were examined: Prince Albert with a pathologist establishing a practice in 1984/85; and Swift Current with no pathologist in the region.

As expected, the utilization of lab services by residents in the Prince Albert region increased dramatically, while there was a much lower increase experienced by the Swift Current residents. However the numbers produced here are soft due to the lack of information on lab services in hospitals and the Provincial Laboratory.

For residents of the Swift Current region, utilization and the percent share of services performed by pathologists increased (although not nearly to the same extent as in the Prince Albert region). The nearly half of their pathologist services were performed in Alberta. Perhaps this is where there is easier access pathologist or specialist services.

The results show that the presence of a pathologist (or any physician for that matter) will lead to an increase in utilization at greater rates when there is no pathologist present. However, the total impact can not be measured without data from hospitals and the Provincial Lab.

There is hospital data available for outpatient units. There are difficulties with combining units and physician volumes, the two main ones being units can vary for the same test depending on the machinery using to perform the test and that the consistency of recording units may have changed over time.

The hospital data does show a drop in per capita units for Prince Albert after the private lab opens, however, this also dropped in Swift Current. When compared to Prince Albert, there are lower physician volumes in Swift Current but higher hospital volumes.

Because of the difficulty comparing hospital and physician volumes, little can be said about the combined volumes. For instance, the 1991/92 physician volumes are 160 percent greater in Prince Albert but Swift Current's hospital volumes are 85 percent higher. However, estimates have been made for the 1991/92 payments for hospital and physician lab services -- $2409 per 100 population in Prince Albert versus $1428 for Swift Current. This result combined with the relative differences in physician and hospital volumes would indicate greater use of measurable laboratory services by the Prince Albert region residents compared to those in the Swift Current region.

RURAL MUNICIPALITIES AND INDIAN RESERVES BY REGION

Swift Current		Prince Albert	
Rural Municipalities	Indian Reserves	Rural Municipalities	Indian Reserves
017	757	401	723
018		402	726
019		429	727
045		430	760
046		431	762
049		459	763
051		460	765
075		461	766
076		463	
077		464	
078		490	
079		491	
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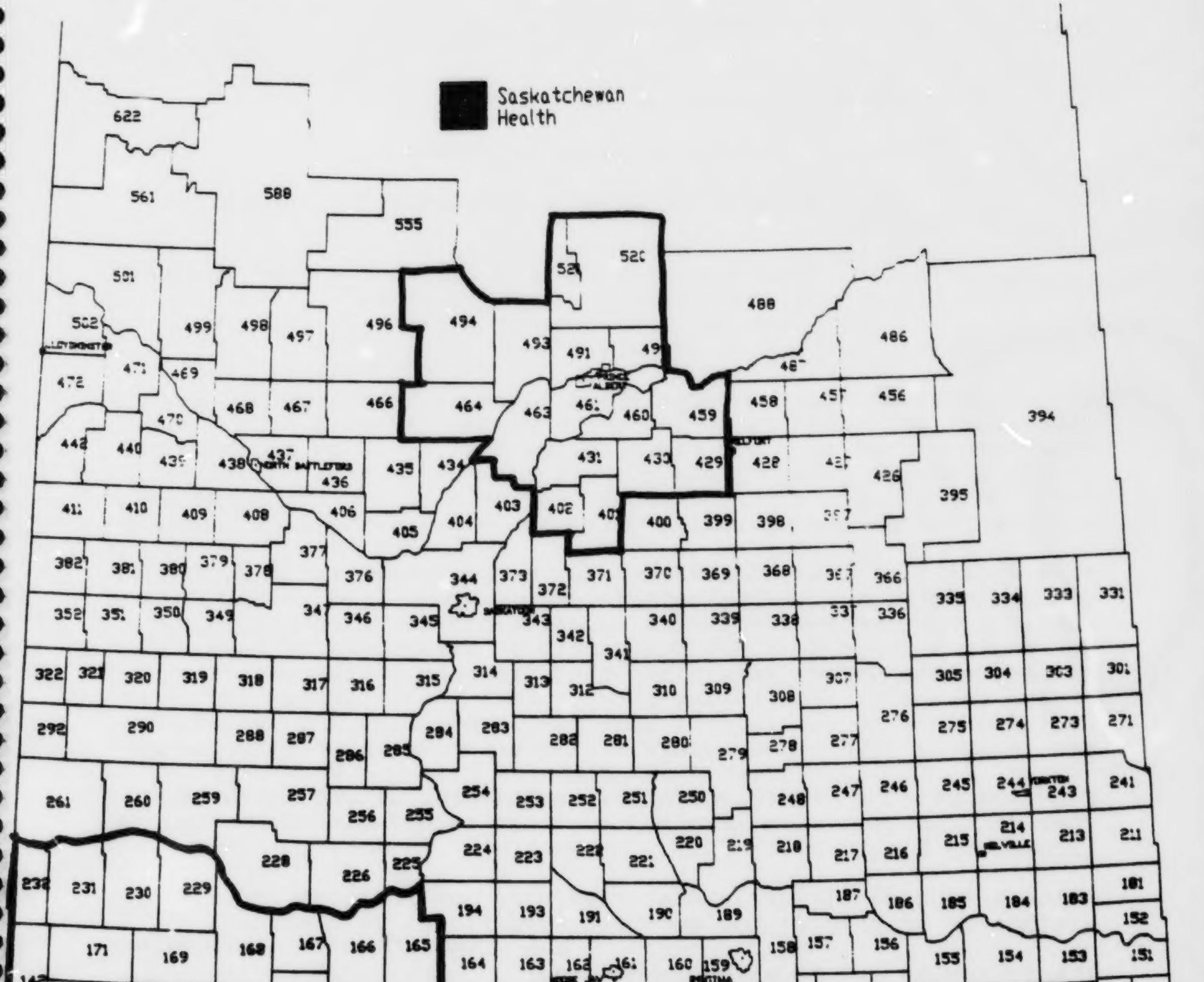
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APPENDIX F

NEEDS ASSESSMENT

Criteria used in assessment

1. Existing capacity in laboratories
2. Types and numbers of tests performed
3. Whether there would be an unnecessary duplication of services
4. The quality of patient care, specifically turn around times.
5. The convenience of patients

To determine the excess capacity in existing laboratories each laboratory was asked to estimate the number of tests in Hematology, Chemistry and Microbiology that could be accommodated by the laboratory beyond the current workload. This additional workload would be accommodated on the basis of current space and equipment with labs operating up to 24 hours, seven days a week.

Most laboratories assumed the excess capacity was to be estimated for the high volume, routine Chemistry tests. Laboratories providing estimates for excess capacity for tests that were not currently performed at any other site or determined to have no or little excess demand were eliminated from the estimations for excess capacity. For evaluation purposes the following was included in each discipline: Chemistry - profiles and urinalysis, Hematology - CBC's and PT/PPT's, Microbiology - total specimens.

For laboratories providing data in units, the actual tests or specimens numbers were obtained from the information submitted to laboratory licensing or MCIB.

Volumes from satellite laboratories were not included in this evaluation as they do not generate significant volumes.

The following are locations evaluated:

Regina
Saskatoon
Prince Albert
Moose Jaw
Rosetown

REGINA

In the city of Regina there are 8 processing laboratories, Plains, Pasqua, General, 2 Professional Medical Laboratories, Regina Medical Laboratories a Community Clinic and Provincial Laboratory.

Plains

	Current	Capability to perform
CBC's	125 specimens/day	1600 specimens/day
PT/PTT	60 tests/day	800 tests/day
Chemistry	1800 tests/day	4000 tests/day
Microbiology	80 specimens/day	275 specimens/day

General

	Current	Capability to perform
CBC's	165 specimens/day	1165 specimens/day
PT/PTT	90 tests/day	1600 tests/day
Chemistry	2805 tests/day	17,805 tests/day
Microbiology	100 specimens/day	360 specimens/day

Pasqua

Pasqua indicated that at the present time there is no excess capacity, however, instrumentation replacement would significantly increase capacity. Microbiology is in transition between manual and semi-automated equipment and therefore it is difficult to assess at this time.

Professional Medical Labs 1 and 2

	Current	Capability to perform
CBC's		These two laboratories, in their best estimation could have the capability to perform at least an additional 50% of their current workload.
PT/PTT		
Chemistry		
Microbiology		

Regina Medical Labs

	Current	Capability to perform
CBC's	85 specimens/day	685 specimens/day
PT/PTT	20 tests/day	370 tests/day
Chemistry	791 tests/day	3231 tests/day
Microbiology	21 specimens/day	292 specimens/day

All laboratories, except the Pasqua, indicated they have excess capacity. In this analysis the role of Provincial Laboratory is redefined to reflect a regional approach to providing services. It is assumed that routine Microbiology and Chemistry could be distributed to hospitals within the region having the current capacity, capability and instrumentation to perform these tests.

Regina is then left with 7 processing centres 6 of which are major.

Examining areas outside the Regina area the Provincial Laboratory has the capability to handle all the thyroid function tests currently performed in the province.

When considering the excess capacity in Chemistry the General Hospital, with increased staff, can absorb all the Chemistry testing currently performed in Regina (Plains, Pasqua, PML-1, PML-2, RML and the Community Clinic).

It is noted, however, that any laboratory with a Hitachi 747 can analyze approximately 1650 chemistry profiles per day which would equate to 9,636,000 tests/year. Therefore, the capacity at any given site can be increased dramatically by simply upgrading instrumentation to one that has a higher capacity.

Hematology and Microbiology, with the estimates provided, could also be handled by one laboratory.

OPTIONS

Regina could in fact have one "super" lab that could handle the majority of the high volume tests but an alternative option may be to divide the services (disciplines) between two existing laboratories and have "stat" services at the other sites.

1. One laboratory in Regina can perform all routine Chemistry and Hematology analysis with stat labs in the acute care hospitals. Hospitals performing biopsies would also need quick sectioning (Histology) capabilities.

2. Two laboratories could divide the services.

3. Specialized Chemistry testing should be performed at only one laboratory. This includes tests available in multiple locations such as protein immunoelectrophoresis (Regina General and Provincial Lab). This could also apply to testing currently being performed in multiple sites within the province (Cytology and thyroid testing).

4. Tests that are referred out of province that can be done at a lower cost in province should be done at a reference centre (Provincial Lab) or the most appropriate laboratory assigned to perform related testing.

5. Although the other disciplines were not specifically addressed Histology, Bloodbanking and Cytology can also be centralized.

6. Based on the analysis of capacity and even with the division of services there would still appear to be too many processing labs for maximum efficiency.

   Example: Lab 1 - Chemistry and Hematology, Bloodbanking

   Lab 2 - Microbiology, Cytology, Histology

Satellites

In dealing with the issue of convenience and patient accessibility to laboratory services the location of satellites (bleeding stations) was examined. There are now 26 satellites in Regina. The distribution of these satellites in relation to base hospital laboratories, Category 3 laboratories or Category 2 laboratories would indicate that there is an uneven distribution and that several satellites are in very close proximity to other laboratories. In conclusion the number of satellites could be decreased without impeding patient convenience or accessibility.

These examples are separate locations.

Location 1	There is a satellite within 1 block of a base hospital.
Location 2	Within a four block radius of one another there are 3 satellites and Category 2 laboratory.
Location 3	Within a four block radius of one another there are two satellites, a Category 2 and Category 3 laboratory.

SASKATOON

In Saskatoon there are 7 processing laboratories, Royal University, St. Paul's, City, Medical Arts, Prairie Associated, Saskatoon Community Clinic and Westside Community Clinic. The Saskatoon Community Clinic produces significant volumes while the Westside Community Clinic is very small in comparison to the other laboratories. Saskatoon has 6 large processing laboratories.

Royal University

	Current	Capability to perform
CBC's	422 specimens/day	3272 specimens/day
PT/PTT	294 tests/day	3004 tests/day
Chemistry	3313 tests/day	13,913 tests/day
Microbiology	152 specimens/day	261 specimens/day

City

	Current	Capability to perform
CBC's/PT/PTT	200 specimens/day	802 specimens/day*
Chemistry	720 tests/day	3632 tests/day
Microbiology	65 specimens/day	372 specimens/day

* Although City stated these were tests/day it is assumed that in all probability these are specimens/day.

St. Paul's

	Current	Capability to perform
CBC's	170 specimens/day	595 specimens/day
PT/PTT	41 tests/day	144 tests/day
Chemistry	1832 tests/day	6412 tests/day
Microbiology	60 specimens/day	210 specimens/day

**Royal University stated that they could handle all the Microbiology (Bacteriology) from Saskatoon and surrounding area with some additional space. Under direction of their health board they will be handling the Microbiology for all three base hospitals.

All options for Saskatoon are listed in the document on Laboratory Services presented to the Saskatoon Health Board.

Satellites

These are examples of separate locations.

Location 1	Within a four block radius of one another there are 2 satellites and a category 2 laboratory.
Location 2	Within a four block radius of one another there are 2 satellites and a base hospital laboratory.
Location 3	Within a four block radius of one another there are 5 satellites, a category 2 and a category 3 laboratory.
Location 4	Within a four block radius of one another there are 3 satellites and a base hospital laboratory
Location 5	Within a four block radius of one another there are 3 satellites and 2 category 2 laboratories.

PRINCE ALBERT

Victoria Union

	Current	Capability to perform
CBC's	120 specimens/day	360 specimens/day
PT/PTT	40 tests/day	200 tests/day
Chemistry	1391 tests/day	4130 tests/day
Microbiology	124 specimens/day	384 specimens/day

P.A. Medical Labs

	Current	Capability to perform
CBC's	30 specimens/day	120 specimens/day
PT/PTT	6 tests/day	24 tests/day
Chemistry	548 tests/day	2192 tests/day
Microbiology	51 specimens/day	204 specimens/day

Prince Albert has 2 processing labs. The Victoria Union Hospital has the capacity to perform all the testing for the area. P.A Medical Labs with new equipment in Chemistry and Hematology could also have the capacity. Given Prince Alberts' test volumes it is concluded that there is not enough volume to support two processing labs.

MOOSE JAW

Moose Jaw has 3 processing labs, two hospitals laboratories and a Category III laboratory.

Providence

	Current	Capability to perform
CBC's	40 specimens/day	150 specimens/day
PT/PTT	5 tests/day	80 tests/day
Chemistry	210 tests/day	2730 tests/day
Microbiology	20 specimens/day	50 specimens/day

Union

	Current	Capability to perform
CBC's	100 specimens/day	1,154 specimens/day
PT/PTT	30 tests/day	480 tests/day
Chemistry	930 tests/day	17,920 tests/day
Microbiology	50 specimens/day	150 specimens/day

Moose Jaw Medical Laboratory *

* Current capability from MCIB

	Current	Capability to perform
CBC's	25 specimens/day	This laboratory, in their best estimation could have the capability to perform at least an additional 50% of their current workload.
PT/PTT	1 test/day	
Chemistry	200 tests/day	
Microbiology	0 specimens/day	

Both hospitals in Moose Jaw Union appear to have the excess capacity to handle all the work currently being done in the city. The Union hospital has far more capacity than the Providence hospital. Professional Medical Laboratories recently took over the operation of Moose Jaw Medical and provided estimates in only broad terms (additional 50%), therefore it is difficult to assess their capacity.

Under the present circumstances, Moose Jaw would require only one processing laboratory.

ROSETOWN

When evaluating the Rosetown health district two scenarios could exist.

1. It is assumed that Rosetown is the central testing laboratory and this hospital would be the only hospital in the district with "hospital beds". Rosetown would not increase their current number of hospital beds. The other hospitals would become "wellness" centres not requiring any "stat" bloodwork or diagnostic radiology. The savings in this example would be $320,348 in salaries and supplies. Long term savings are more difficult to assess since these laboratories would no longer require new equipment. These savings do not take into account the dollars that would be saved from overhead costs.

2. It is assumed that Rosetown is the central testing laboratory and this hospital would be the only hospital in the district with "hospital beds". Rosetown would increase their current hospital beds by a total number presently in the other hospitals in the district. In this example the laboratory units would shift from the other hospitals to Rosetown and the savings in staff and supplies would be approximately 2FTEs and 1/3 the supply costs or $83,282. Again this not take into account the savings from overhead costs.

Currently the hospitals in this district provide a small range of "stat" tests that includes: Glucose, urinalysis, and basic hematology.

In conclusion, under the present circumstances the hospitals surrounding Rosetown provide only "basic" laboratory services. These basic services should remain in place if the hospital beds are to remain. If these facilities are to be assigned new roles wellness/nursing homes, then the testing can be performed at Rosetown.

Factors Assumed to Contribute to Laboratory Utilization Problems

1. Physician Factors
    - a) Faulty decision-making processes
        - Overreliance on laboratory tests to suggest the nature of illness
        - Overreliance on screening to detect occult disease
        - Lack of understanding of pathophysiologic relationships
        - Lack of appreciation for methodologic limitations due to the following:
            - i) Sensitivity and specificity
            - ii) Physiologic variation
            - iii) Methodologic variation and interferences
            - iv) Drug-induced variations
        - Increased reliance on objective data
            - i) Overemphasizing laboratory findings in relationship to history and understanding
            - ii) Lack of security in clinical skills
        - Faulty diagnostic strategies
            - i) Ordering related by inappropriate tests
            - ii) Ordering less-than-optimal test groupings
            - iii) Ruling out highly unlikely diagnostic alternatives
            - iv) Omission of pertinent tests
            - v) Misinterpretation of data
    - b) Information Overload
        - Overlooking useful laboratory results
        - Ignoring unrequested results
    - c) Faulty therapeutic monitoring techniques
        - Repeating batteries that have all normal results
        - Repeating tests too frequently
        - Ordering batteries when subsets would suffice
        - Automatic serial repetition of tests
        - Routine protocol orders in intensive-care areas
        - Standing orders
    - d) Unconcern for or unfamiliarity with costs
        - Lack of appreciation of or interest in patients' costs
        - Lack of accurate information regarding laboratory charges
        - The physician's ethic to do everything possible for the individual patient
        - The ''technological imperative'' to provide the best care technically possible
    - e) Increasing scientific knowledge
    - f) Subspecialty-based fragmentation of care
    - g) Physicians in training
        - Doing all remotely justified tests to satisfy attending physician or consultant
        - Curiosity-based testing
        - Faulty testing strategies because of relative inexperience
    - h) Fear of malpractice allegations
    - i) Payment incentives

2. Laboratory factors
    a) Multichannel instruments with test groupings based on analytical convenience rather than physiologic relationships
    b) New laboratory conveniences
        - Venipuncture service
        - Rapid availability of results
    c) Delayed reporting
    d) Production and presentation of large volumes of data
    e) Introduction of new tests with little or unproved effectiveness
    f) Maintenance of outmoded procedures
    g) Payment incentives

3. Medical science factors
    a) Rapid expansion of the testing repertoire
    b) New diagnostic and therapeutic approaches for many chronic and acute illnesses that require careful laboratory monitoring

4. Patient and societal factors
    a) Expectation that physician must do some procedure
    b) Health care as a right
    c) Third-party carriers pay the bill
    d) An increasingly litigious society
    e) Health policies directed to chronic illnesses

5. Hospital factors
    a) Noncritical encouragement of batteries by accreditation groups
    b) Introduction of intensive care units and dialysis centres
    c) Decreased length of stay
    d) Shift toward more severely ill patients

Source: Editorial, Archives of Pathology and Laboratory Medicine, Vol. 104, February 1980